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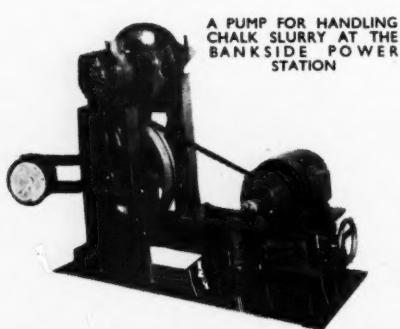
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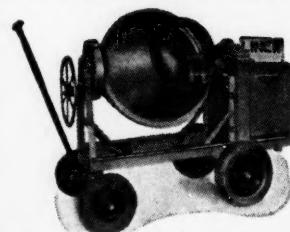
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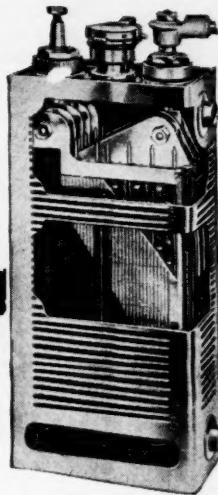
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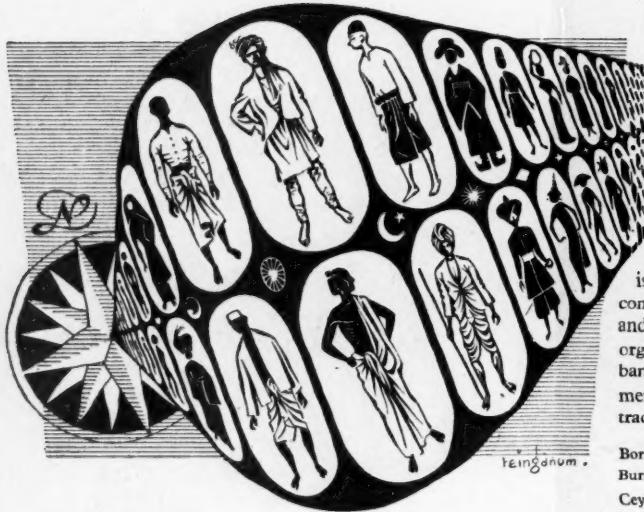


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The Mining Journal

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NOTES AND COMMENTS

President Eisenhower's Programme

The anxiously expected message of the new President of the United States to his Congress was delivered by President Eisenhower on Monday in a message of some 7,000 words. Most of it was naturally devoted to domestic issues which could hardly make any great appeal to the world outside the United States. Inevitably, therefore, what caught foreign attention principally was the enunciation of "a new positive foreign policy, clear, consistent and confident." Such a policy he said demanded closer co-operation among the nations of Europe than had hitherto been known, which would supply evidence to the American people that their material sacrifices were not being made in vain.

In discussing foreign policy he put the Korean war in the forefront. This war was for Americans the most painful phase of Communist aggression which was evidenced also in Indo-China and Malaya. He recalled that in June, 1950, the United States 7th Fleet had been instructed to insulate Formosa by preventing any attack upon the island while at the same time denying its use as a base to Marshall Chiang-Kai-Shek for operations against the mainland. This had worked out in effect as providing a defensive arm for Communist China. In view of the increasing efforts of the Communists to defeat the United Nations forces in Korea there was no longer any logic or sense in maintaining this policy and he was ordering that the fleet should no longer shield Communist China. In view of the many reports we have had from leading military authorities that the Korean front is in a state of complete stalemate, the more active policy now proclaimed may not be altogether unwelcome and it is perhaps significant that, according to Peking radio, the Prime Minister of Communist China yesterday proposed an immediate cease-fire in Korea on the truce terms already agreed with the United Nations.

However, for some time there has been a good deal of natural anxiety outside the U.S. about the effects of such a move which, if associated with agitation in the United States to assist the Generalissimo to undertake an invasion of Central or Southern China, is entirely contrary to the policy pursued by our late Government in endeavouring to pacify Chinese intransigence. Mr. Eden in Parliament on Tuesday seemed inclined to deplore the move, which he

thought was likely to entail serious repercussions on the concord of the United Nations. First reports from Japan are also critical as it was feared that any Chinese Nationalist attempt at blockade might lead to complications with Britain or Japan, to say nothing of inviting the presence of submarines from Vladivostock; German opinion is also said to be uneasy. Mr. Churchill's reluctance to express any opinion in advance of the President's speech seemed to suggest that whatever he was told confidentially was not too welcome. No doubt the matter will be further debated both here and elsewhere.

Turning from military to economic matters, the President called for a stop to further planned deficits and demanded a balanced budget. He said that the national debt to-day was more than \$265 billion, besides \$80 billion of obligations for future payment and other large contingent liabilities. The present authorised national debt limit is \$275 billion, which may well be exceeded. A balanced budget was essential to check further depreciation in the buying power of the dollar and overcome further inflation. What this programme represents we shall only know later. President Eisenhower called particularly for taxation reforms which will present the least possible obstacle to the dynamic growth of the country.

He further declared that the weight of evidence was clearly against the use of controls in their present form; they have not prevented inflation or kept down the cost of living, so that the dissatisfaction with these was wholly justified—experiences which are not unknown in this country. He therefore does not wish for a renewal of the present wage and price controls when they expire on April 30. Material and product controls will also be abolished where not necessary for defence priorities. At the same time increased attention is being directed to the conservation of natural resources, especially water and minerals.

On the thorny problem of the relations of labour and capital he was rather non-committal; five years' experience of the Taft-Hartley Act showed that early corrective action was essential and both Congress and the Department of Labour were working out proposals. On the colour question, the President proclaimed the equality of rights of all citizens of every race, colour and creed. He also called for a revision of existing immigration laws.

Future of Malayan Tin Mining

In the speeches of the chairmen at the recent meetings of the Sungei Besi and Ayer Hitam Mining Companies and of the Malayan and Southern Malayan Tin Dredging Companies, reports of which appear elsewhere in this issue, a note of increasing urgency regarding the future of Malayan tin mining may be detected. Both Messrs. G. W. Simms and Ernest Pearce present a strong case, and one which has long been familiar to our readers, for increased attention to the future of the mining industry by the Governments at to the future of the country's tin mining industry by the Governments at home and in Malaya. The two chief threats to the future of tin mining in Malaya rise, of course, from exproprietary taxation and the long cessation of prospecting.

Probably the tin restriction measures imposed on the country after 1930 were responsible for the first serious anxiety regarding the future of the tinfields. Mr. Pearce points out that ever since prospecting was prescribed, some 20 years ago, the search for new tin land has been almost at a standstill, in later years due, of course, to the war and subsequently to the Communist disorders. In 1938, Sir Lewis Fermor was appointed by the then Colonial Secretary to report on the condition and future of the industry and his report, extensively reviewed in the *Mining Journal*, and often referred to since, expressed the opinion that reserves known and assumed might last for another 30 years, with an average extraction of some 50,000 tons a year. Under the influence of abnormal prices, production in the last three years has been exceeding this figure, but now, in the opinion of the companies under consideration, Malaya is confronted with the certainty of a serious though probably gradual fall in its tin output.

While progress is certainly being made in the restoration of order in the Malay States it is impossible to say when prospecting of new ground on a substantial scale will again be possible and both chairmen estimate that some five years will be necessary to install new dredges in stanniferous land yet to be located at a cost of something like £1,000,000 for a big new installation.

Such a figure raises very sharply the exproprietary taxation, direct and indirect, from which the industry suffers at the present time. Mr. Pearce mentioned that in the case of the Malayan Tin Dredging Ltd., current accounts show a profit of £1,200,548, of which profits tax, etc., absorb £771,228 and export duties on concentrates £292,477, a total of approximately £1,064,000. This is a typical instance of what Malayan concerns have got to endure and obviously makes it impossible, were new ground available, to find the capital adequately to develop it.

Mr. Simms is optimistic that an increase in world consumption is more likely than an increase in output. We trust that he is correct, but up to the present the trend is the other way and it would be very risky for the authorities at home and in Malaya to rely upon such a prospect.

Cheralite — A New Radioactive Mineral

The discovery of a new kind of mineral very rich in the radioactive elements thorium and uranium was announced on January 22 last at the Mineralogical Society by Mr. S. H. U. Bowie and Mr. J. E. T. Horne of the Geological Survey and Museum, D.S.I.R. Recognition of a new mineral species is a rare event.

The mineral contains 31 per cent thorium oxide and 4 per cent. uranium oxide. It has been named cheralite, from Chera, the ancient name of the State of Travancore in South India where the new species was found. The deposit of the mineral is unfortunately much too small to be of any commercial importance. A specimen of the new mineral is on display in the Geological Museum, South Kensington. It is of a dull green colour, in lumps an inch or two in size. Mineralogically it is related to monazite.

Western United States

(From Our Own Correspondent)

Portland, Oregon, January 22.

After five months of negotiation the wage dispute affecting the copper industry was settled late in December when Kennecott, last of the major producers to come to terms with its employees, reached an agreement with Mine, Mill and Smelter Workers' Union. If matters proceed as in the past it may be expected that another demand will be made on the producers before 1953 is too far advanced. The International Security (McCarran) Committee of the U.S. Senate made an investigation of M.M. and S.W. last autumn and as the result of an extensive hearing held at Salt Lake City reached the conclusion that the union is Communist-dominated and has made drastic recommendations affecting the situation.

After much urging the Office of Price Stabilization has agreed to meet with representatives of the copper industry to consider decontrol of prices and some uniform pricing system to correct the confused situation that now exists.

While heavy rains are relieving the water shortage in the north-west to some extent many districts are still restricted as to use of hydro-electric power. Partial relief has been given the aluminium industry of Oregon and Washington but the Coeur d'Alene district of Idaho is apprehensive of the future unless there is a great improvement in the water situation. Coeur d'Alene mines were ordered in November 1952 to reduce power consumption 10 per cent below that of the previous year's comparable period. It so happened that in the comparable 1951-52 period the district was afflicted by a labour shortage and mines were operating at less than capacity so that a 10 per cent cut based on that period is far more serious than a similar cut based on normal demands. When one considers such constant demands as pumping and maintenance it can be seen in some cases actual production will be seriously affected. Sullivan Mining Co.'s output at its zinc plant has been reduced 25 per cent because of the power shortage and it has been necessary to lay off 60 men. In the Metaline district in Stevens County, Washington American Zinc, Lead and Smelting Co. is substituting diesel drive for electric on its compressors as a means of conserving electric power.

NEW MEXICO

After several years of thorough exploration and testing Southwest Potash Corporation (American Metal Co.) has commenced production of muriate of potash at its new plant at Carlsbad, the fifth to be established at this point which is now the potash producing centre of the country. The mill has an initial capacity of 3,000 tons daily and is so designed that capacity can be increased without affecting operation. The project has involved an expenditure of \$11,000,000 in exploration, development and construction.

International Minerals and Chemical Corporation, another of the companies operating at Carlsbad, is enlarging its plant to increase production of sulphate of potash by 35,000 tons per year.

UTAH

That the uranium discovery in the Marysville district is not of a transitory nature is evidenced by the fact that after sinking two inclines to the 700 level Vanadium Corporation of America is now raising a three compartment vertical shaft from that level to serve as the main working entry of the mine. New surface equipment is being installed.

International Smelting and Refining Co. (Anaconda) has closed its zinc-lead plant at Tooele until there is some improvement in the price situation. This leaves U.S. Smelting Co.'s plant at Midvale as the only one between Colorado and the coast receiving such ores.

The Position of Australian Tin Mining

The Australian Tin Producers Association has in recent weeks been urging upon its Government the necessity of encouraging domestic tin production by such means as a guaranteed minimum price over a ten year period and through increased tax concessions. In the article which follows, our Australian correspondent discusses some of the fiscal and other deterrents which at present confront the Australian tin producer.

Australia's tin mining industry, though not large measured by those of Malaya or Cornwall in the days of the Duchy's prosperity, has nevertheless been important. The principal tin-producing States have been, and are, Queensland, New South Wales, and Tasmania, with smaller production from W. Australia, Victoria, and N. Territory.

DECLINE IN PRODUCTION

In recent years, Australian tin production has fallen from 3,494 tons of metal in 1941 to 1,449 tons in 1951. Causes of the decline may be summarized as : (1) The general unfavourable attitude of the investing public to tin mining, accentuated by wartime Government discouragement of private enterprise ; (2) Taxation, both company, and personal income tax ; (3) Uncontrolled cost spiral arising from the fantastic and unchecked rise in wages, coupled with the crippling reduction in working hours ; (4) The pegged Australian price for tin and the compulsion to sell local output in the country ; and (5) the great expansion in Australian secondary industries.

Generally, tin mining became unpopular with the investing public some 30 years ago, with the result that companies formed for alluvial and lode tin mining were usually under-capitalized ; ventures were undertaken without proper, or any, sampling, or with inefficient and unserviceable plant, and lode mines were expected to finance their development from ore to be won in the course of exploration. Consequently lode occurrences of promise were often abandoned on the exhaustion of the shallow ore shoots, there being no capital to continue exploration through lean zones or to keep the company intact over a period of low metal price. In other cases capital was lost through the failure of companies owing to the unpayable nature of the occurrences which proper sampling would have disclosed.

INJUDICIOUS TAXATION

Prior to World War II, calls made on the contributing capital of mining companies were allowed as deductions from taxable income, a concession which was withdrawn during the war and has not been restored. Now, only 33½ per cent of calls paid is permitted as deduction ; only 20 per cent of dividends in the hands of shareholders, and 20 per cent of company profits are tax-free ; the fact that the total dividends in many mining enterprises do not return the capital invested being completely ignored.

On the other hand, a concession was granted to the industry in 1951, by which capital expenditure on plant, development, housing and welfare, is allowed as a deduction for taxation purposes, by one of three methods, at the option of the taxpayer : (1) In annual deductions, determined by dividing the expenditure by the estimated years in the life of the mine, applicable to plant, development, housing and welfare ; (2) Deduction of the whole or portion of the expenditure from the income of the year in which the expenditure is incurred ; applicable to plant and development ; (3) Normal depreciation deductions over the life of the asset ; applicable to plant.

During the war, Treasury approval was required for all new enterprises, or for increase of capital in established undertakings, and the price of shares traded-in on the stock exchanges was pegged, frequently at very inadequate levels. All these factors were effective deterrents to enterprise, and although share trading has been free since the close of the war, taxation provisions continue, modified by the conces-

sion stated, and capital issues control is maintained for all flotations exceeding £A10,000—an exemption which is quite inadequate for any purpose at the present time.

OTHER DETERRENTS

With a basic wage exceeding £A11 8s. per week in most mining districts, with industry allowances, marginal allowances, penalty overtime rates up to 100 per cent of the normal wage rate, and a 40 hour week, a very heavy and almost prohibitive burden is placed on the industry. This has been aggravated by the pegging of the Australian price for tin below world parity and the compulsion to sell local production within Australia. It is stated that the prohibition of export has deprived local producers of some £A2,000,000 in the past ten years. The recent decline in the overseas price for tin, however, has brought the pegged price close to world parity, so that at the moment, the Australian producer is not at a disadvantage.

All branches of mining have suffered severely through the industrial expansion in secondary industries which has drawn labour from mining, and by offering a more attractive field for investment and speculation has attracted a very large part of available capital.

The effect of taxation, costs and the pegged tin market price is exemplified by Tableland Tin Dredging Company in North Queensland, formed in 1937 with a capital of £A246,000, which had later to be supplemented by preference shares and bank overdraft totalling £A218,000 to complete the construction and operating programme. The modern dredge, with an annual capacity of 4,500,000 cu. yd., for a long period produced 60 tons of tin oxide per month, but because of the causes stated, shareholders have received an average return of only 2½ per cent per annum over 15 years. Existing conditions do not give incentive for, or encourage prospecting for tin, or the development of tin occurrences, nor do they give existing companies inducement to expand their enterprises. Certain valuable concessions, as mentioned, have been granted, but it is felt that two additional factors should be conceded ; the total exemption of calls from taxation, and full exemption of profits from taxation until the subscribed capital of the company has been returned to shareholders.

SCOPE FOR EXPLORATION

The field for exploration for tin in Australia is not exhausted. Alluvial areas exist in North Queensland, and possibly in New South Wales, which might be exploitable at the present price for tin if the existing disabilities were removed or reduced. There are lode tin fields in New South Wales, Queensland, Tasmania and Northern Territory, which warrant careful investigation. There is evidence suggesting that large, low grade occurrences may exist adjacent to high grade shoots of tin ore previously worked, which might warrant working on a large scale. There is also the possibility in certain lode areas of working several small mines as a group, with central milling plant, but necessitating adequate capital to establish such ventures successfully. To turn prospective tin resources to account needs financial strength, and in view of the inadequate supply of local tin for the country's requirements, and the increased quantities that will be called for when the tin-plate industry has been established, the fullest encouragement should be given to revive the tin mining industry which has been, and may be, of considerable importance to Australia.

Zinc and Lead Mining in Italy

The following article presents facts and figures pertaining to the zinc and lead section of the Italian mining and metallurgical industry. The statistics here presented are based on an article contained in the January issue of the *Review of Economic Conditions in Italy*, published by the Banco di Roma.

The most important Italian lead and zinc mines are those of Sardinia, which supply about 93 per cent of the country's lead ore and almost 80 per cent of her zinc requirements. Other localities where these two ores are found are, in order of importance, the Upper Friuli, near Tarvisio in the north-east, where the large Raibl State-owned mine, which is particularly rich in zinc ore, is situated; the Bergamo district which is becoming increasingly important as a zinc ore producer; the Upper Adige, where the Monte Neve State-owned mine is situated at a height of 2,500 metres above sea level; an area in the Cadore region where prospecting has recently revealed large masses of mineral, mainly zinc ore, and where modern beneficiation plants are being set up. Prospecting is under way in Lombardy, Tuscany and Sicily.

With the up-to-date beneficiation plants available in Italy, concentrates containing up to 70-72 per cent lead and 60 to 62 per cent zinc are obtained. These results are achieved by means of flotation combined with a pre-concentration process. It has thus been possible to mine deposits which have not been previously considered economic, and new horizons have been opened up in mines that had been abandoned for several decades. In 1951, Italy possessed 63 productive zinc and lead mines, employing 11,235 workers. Output of zinc concentrates totalled over 160,000 tons and that of lead concentrates amounted to over 64,000 tons. The trend in this sector of the Italian mining industry is illustrated in the following table (in tons) :

Years	Lead Conc.	Zinc Conc.	Ferruginous Zinc Ore
1938 ..	67,493	154,886	45,962
1939 ..	74,270	175,148	53,548
1940 ..	75,030	154,223	57,288
1941 ..	66,974	139,702	52,476
1942 ..	51,430	120,165	52,066
1943 ..	30,952	79,213	25,590
1944 ..	5,752	38,494	11,870
1945 ..	4,332	14,496	16,400
1946 ..	23,866	44,565	20,093
1947 ..	37,317	96,750	23,036
1948 ..	47,256	125,388	20,973
1949 ..	57,273	123,454	26,533
1950 ..	63,128	137,750	40,873
1951 ..	64,269	160,419	50,011

The above table shows that 1940 was the peak year for lead ore, and 1939 for zinc ore; these figures were in fact the highest on record. After the decline during 1943-44, output recovered slowly owing to supply difficulties and then at an accelerated rate until a fairly satisfactory level was reached in 1951, particularly in the zinc section. Although no figures have as yet been made public for last year, prospects are considered to be very favourable.

Metallurgy in the field of lead and zinc, the industrial foundations of which date back to the second half of the past century as regards lead and to the 1914-18 war in the case of zinc, has developed at the same rate as the production of these ores.

THE LEAD INDUSTRY

The Italian lead industry consists of the following enterprises: First, the Pertusola (La Spezia) foundry founded in 1860 by the Soc. Mineraria e Metallurgica of Pertusola and having a theoretic productive capacity of 25,000 tons of lead metal a year; second, the Monteponi (Iglesias) foundry belonging to the Montecatini company, founded in

1894 and having a theoretical capacity of 10,000 tons; and third, the San Gavino (Cagliari) foundry of the Montecatini, opened in 1932 with a theoretical capacity of 35,000 tons of lead per annum. The combined productive capacity of these lead works is 70,000 tons of metal per annum, corresponding to about 125,000 tons of concentrates. However, as Italy's own output is insufficient to feed these foundries at full capacity, foreign ores were imported before the war, but these imports have dwindled to practically nil.

THE ZINC INDUSTRY

As far as the zinc industry is concerned, the situation is quite different—productive capacity is, in fact, insufficient to cope with the ore output. The following zinc plants are available: First, the Vado Ligure (Savona) thermal plant of the Monteponi Company, installed in 1916 with a capacity of 12,000 tons; second, the Monteponi (Iglesias) electrolytic plant of the same company, founded in 1926 with a capacity of 7,000 tons of metal per annum; third, the Crotone (Catanzaro) electrolytic plant of the Soc. Mineraria e Metallurgica of Pertusola, founded in 1928 with a capacity of 18,000 tons per annum; and fourth, the Porto Marghera (Venice) electrolytic plant of the Montevicchio company founded in 1936 with a total capacity of 18,000 tons. Present installations have thus a total capacity of 55,000 tons of zinc per annum. However, it should be added that the capacity of the Crotone plant was to have been brought up to 25,000 tons last year and also that the Soc. An. Piombo e Zinc has nearly completed construction of a new electrolytic plant with an annual capacity of 15,000 tons of metal at Nossa (Bergamo). Total capacity (electrolytic and thermal) will thus rise to 77,000 tons p.a.

Connected with the metallurgy of lead and zinc is that of silver and cadmium, since varying percentages of silver are present in the Italian lead glance and the blende contains cadmium. The following table shows the output of lead, zinc, silver and cadmium processed from Italian ores between 1938 and 1951:

Years	Lead (tons)	Zinc (tons)	Silver (Kg.)	Cadmium (tons)
1938 ..	37,860	33,637	25,300	182
1939 ..	37,760	35,400	21,400	146
1940 ..	38,970	39,400	23,300	215
1941 ..	38,580	38,800	25,300	184
1942 ..	30,160	34,200	19,990	123
1943 ..	19,150	25,200	7,460	72
1944 ..	2,230	6,100	2,520	39
1945 ..	2,830	1,517	40	29
1946 ..	14,290	15,805	9,760	40
1947 ..	19,250	22,849	10,510	38
1948 ..	28,764	26,397	18,520	47
1949 ..	28,552	26,602	24,680	74
1950 ..	39,913	38,119	26,500	75
1951 ..	38,240	47,227	27,020	205

The above figures show that whereas the peak in lead production was in 1950, the peaks for zinc, silver and cadmium were in 1951. There has been a marked increase in the output of zinc, which is 20 per cent higher than the record established in 1940. From an economic point of view, output of lead and zinc represents a yearly value of about 20 billion lire, the highest of all sections of the Italian mining industry. The deposits so far ascertained and those considered probable are sufficient to ensure a period of normal activity of about 15 years. With this in mind the Italian authorities are actively prospecting for new deposits.

Zirconium as a Coming Metal

Though zirconium was first produced more than a century ago, it is only in recent years that it has become available commercially in ductile form, thus providing technologists with a new metal of great potential importance of which, as far as is known, there is still no commercial production outside the United States and Britain. The commencement of this commercial production was mentioned in *The Mining Journal* of May 18, 1951, and zirconium was noted once more in our summary of the Paley Report, issue October 3, 1952.

In many respects zirconium is at much the same stage of development as titanium, which also resembles it metallurgically, in that prices are at present too high to permit extensive usage. Both metals have a promising future, provided that economical processes for large-scale production can be developed, but whereas titanium seems likely to become a structural metal of major importance, zirconium will probably be used in more limited tonnages for highly specialized applications.

Both titanium and zirconium minerals are widely distributed throughout the world; the former element is present in most igneous, metamorphic and sedimentary rocks, while zircon is a minor constituent of most types of igneous rocks. Almost all the zirconium of commerce comes from two minerals, zircon (ZrSiO_4) and baddeleyite (ZrO_2), which are won from the alluvial deposits derived from igneous rocks. Zircon is found in ample quantities in many places, but the only large deposits of baddeleyite occur in Brazil and are of variable quality. Naturally concentrated zircon-rutile-ilmenite black sands at Byron Bay, in New South Wales, are the world's richest source of zircon, followed by the monazite sands of Travancore. Almost half the United States' consumption comes from the Florida beach sand deposits and more zircon is available in tailings from titanium operations than the market can absorb. The free world's known zirconium resources are capable of supplying all requirements that can be foreseen.

The growing use of zirconium and zirconium-rich alloys stems from the Atomic Energy Commission's interest in the metal as a material of construction for certain nuclear reactors. Because of its excellent corrosion resistance and its low thermal neutron absorption cross-section, zirconium appears to be an ideal metal for nuclear energy applications. Unlike uranium and thorium, it does not undergo fission and is of no interest as an atomic fuel. There is no reason, therefore, why it should not be an "open metal," available to industry as a whole. In fact, it is understood that the A.E.C. would prefer to act as a customer to an industry capable of existing without its support. The existence of a zirconium industry of appreciable size depends, however, on the production of a surplus, over and above A.E.C. demands, which is low enough in price to compete with other metals.

THE de BOER IODIDE PROCESS

The current production of zirconium metal in the United States falls into three categories: (1) crystal-bar, made by the de Boer iodide process; (2) sponge, made by the Kroll process; and (3) crude zirconium, made by calcium or calcium hydride reduction of the oxide. Crude zirconium is produced only in limited quantities for special applications and, being non-ductile, is not of interest for applications involving fabrication. Zirconium sponge can be processed by powder-metallurgy techniques or by special melting procedures into massive zirconium of good cold ductility, which can be fabricated satisfactorily. Virtually all the sponge produced, however, is used as a feed material for the preparation of crystal-bar, and no supplies are available for general commercial use.

The de Boer iodide process for the production of crystal-bar depends for its operation on the fact that zirconium tetra-iodide will decompose in vacuum at a high temperature, producing zirconium metal and iodide vapour. Briefly

the process is as follows: A zirconium filament is heated to a high temperature in a vacuum by the passage of an electric current while crude zirconium, produced by the reduction of zirconium oxide by calcium, is heated in the presence of iodine to form the tetra-iodide vapour. This vapour contacts the hot filament and breaks down to yield a zirconium deposit on the filament, at the same time releasing the iodide, which returns to react with more crude zirconium, when the cycle is repeated and the filament is gradually built up. One of the difficulties is the control required to maintain the filament at a constant temperature and at the same time to control the radiated heat. Difficulties due to the formation of non-volatile zirconium by overheating have also been investigated, and the results indicate the possibilities of large-scale operations.

TWO AMERICAN PRODUCERS

Until recently, the entire output of iodide zirconium in the United States was produced by the Foote Mineral Co., but towards the end of 1950 a plant capable of producing longer crystal-bar of larger diameter was constructed by the Westinghouse Atomic Power Division at Pittsburgh, the Foote facilities being simultaneously increased. Crystal-bar hairpins up to 1.7 in. diameter and 12 ft. in overall length have been produced for the A.E.C. in experimental units at the Battelle Memorial Institute, but it is considered probable that commercial development will be directed toward the production of longer lengths of smaller diameter.

The de Boer process is subject to limitations imposed by the fact that the iodination and decomposition reactions are carried out in the same vessel, at low pressures unfavourable to the iodine reaction. Another objection is that the possibility of making the process even semi-continuous is remote. If the iodination and decomposition reactions could be carried out separately, however, the prospects of developing a semi-continuous process would be promising, and there is also a possibility of using a less expensive feed material such as zirconium carbide or zirconium carbonitride. Under the sponsorship of the A.E.C., a semi-continuous process is being developed at Battelle Memorial Institute in which zirconium iodide is prepared by iodination of sponge which then, after purification by fractional condensation and evaporation, is passed through decomposition bulbs similar to an ordinary de Boer bulb. Tests are also in progress on the substitution of zirconium carbide or carbonitride for sponge as a feed material for the process. A low-cost crystal-bar can be considered possible.

THE OUTPUT OF SPONGE

Since the facilities for producing crystal-bar are strongly taxing those for producing the feed material, one of the most immediate requirements is to increase the output of sponge. Not only is sponge an intermediate in the production of iodide zirconium by the existing process, but it is also a potentially useful material for processing to massive zirconium for commercial applications.

Sponge is produced by a process developed by Dr. W. J. Kroll, which depends on the reduction of zirconium tetrachloride vapour by magnesium. The first step is to produce zirconium tetrachloride from a zirconium mineral. This may be done by mixing zircon with carbon and heating the

mixture while a stream of chlorine is passed through it. This yields a light powder which is purified by sublimation in a hydrogen atmosphere. The next step is the reduction of the purified zirconium tetrachloride with magnesium. The reduced mass contains particles of zirconium intermingled with magnesium chloride, which is removed by melting and boiling in a sealed and evacuated steel retort. Finally the sponge is removed from the crucible and cut into small pieces, which are pressed into small billets for convenience and melted. At present the sole producer of zirconium sponge in America is the U.S. Bureau of Mines.

When Murex Ltd. considered the production of zirconium in their works at Rainham, Essex, they chose the Kroll process as the basis for their investigation, and ultimately a plant was built on similar lines to the original plant at Albany.

LIMITATIONS OF KROLL PROCESS

At present the Kroll process is a batch process and the size of the reduction units is limited by the ability to dissipate the high heat of reaction from the units. Recovery of the sponge from the units is a high-cost operation and special precautions are needed to reduce hazards arising from the extreme reactivity of finely divided zirconium. A major improvement in the magnesium reduction process would be the development of a continuous process, with continuous withdrawal of arc-melted sponge and recovery of the magnesium chloride produced by reaction of the magnesium with the zirconium tetrachloride, and subsequently of the magnesium. This presents numerous technical problems, but would be a promising step towards low-cost zirconium.

Many other methods for producing zirconium have been tried experimentally and some have been tried on a small commercial scale. The latter include the reduction of alkali double fluorides with sodium or aluminium, reduction of the chloride with calcium, reduction of the oxide with carbon or the carbide, and reduction of the halides with hydrogen. Arc reduction of the tetraiodide has been investigated by the National Research Corporation for the A.E.C. Much development work would be required to bring such a process to a commercial scale.

REFINING PROBLEMS

Like titanium, zirconium has a strong affinity for the non-metallic elements and particularly for oxygen and nitrogen, which cause embrittlement of the metal. Since there is no practical method for removing them from the metal, it is essential that these elements should be eliminated during the preparation of high purity zirconium. Another problem is that zirconium, particularly in the finely divided state, is extremely reactive when pure, and it must therefore be agglomerated without exposure to the atmosphere if high purity is desired. These considerations have caused investigators to avoid the use of the oxides as a starting material in the metal reduction process and have focussed attention on the use of the halides—for example, the chloride in the Kroll process and the iodide in the de Boer process. The need to avoid contamination of the finely divided material has made it desirable to procure a massive material directly, as in the case of crystal-bar. The same considerations have prompted the use of arc melting in water-cooled crucibles to avoid contamination during melting. Molten zirconium, like molten titanium, is almost a universal solvent and so far normal crucible melting has in general proved unsatisfactory. From these observations it is apparent that purity of commercial zirconium and hence the properties depend largely on production method.

All zirconium ore contains small amounts of hafnium compounds, which because of their marked similarity in properties to the analogous zirconium compounds, can be separated only by special techniques. If the hafnium content is not removed during processing, the metal will have

approximately the same Zr-Hf ratio as the original ore, regardless of the method followed during preparation. For most nuclear applications low-hafnium material is required, but for other purposes it would not be necessary to reduce the hafnium content, which normally comprises about 2 per cent by weight of the metal produced. The hafnium separation process is not expensive, however, and its elimination would have little effect on production costs.

APPLICATIONS AND PROPERTIES OF ZIRCONIUM

Zirconium melts at 1860° C., and has a low linear coefficient of expansion which may make it suitable as a glass-metal sealing metal. The electrical resistance is high at 39×10^{-8} ohm-cm. and similar to that of some resistance alloys. The tensile strength of drawn zirconium is similar to medium-carbon steel, but as the density of zirconium at 6.5 is lower than steel, the strength/weight ratio is in favour of zirconium, although it is not as good as that of high-aluminium alloys or that of titanium with its high tensile strength and low density at 4.5.

Zirconium combines with oxygen and nitrogen at temperatures as low as 400-450° C. Hydrogen is absorbed at low temperatures such as 300-400° C., but is expelled at about 1,000° C. This property has raised the possibility of using zirconium as a means of producing pure hydrogen. Surface hardness may be increased by heating in dry air, oxygen or nitrogen, and hardness values about Rockwell "C" 65 are reported. Zirconium is a free-cutting metal. Zirconium sheet, when annealed, is quite ductile, and deep drawing and spinning should be possible. So far no claims have been made for the welding of zirconium without loss of ductility, but as this has been achieved in the case of titanium by operating under exacting conditions.

Zirconium's outstanding property is its excellent resistance to corrosion to many chemical reagents. The Poley Report considers that the major commercial application of a low-cost zirconium would be in the construction of corrosion-resistant equipment and perhaps as an alloying addition in high temperature materials. A low-cost zirconium could be expected to supplant tantalum in many applications in which resistance to hydrochloric acid is important, since the latter metal is roughly 2½ times as heavy and more costly on a pound for pound basis.

On the other hand, the corrosion resistance of zirconium in sulphuric acid, though excellent in relatively dilute solutions, becomes very poor in concentrations above about 70 per cent. There seems little prospect, therefore, for the application of zirconium in sulphuric acid-resistance equipment.

Like titanium, zirconium has excellent nitric acid resistance at all concentrations and temperatures, but owing to strong competition from other metals, its use as a container for nitric acid would be limited. Except in hot concentrated acid, its resistance to phosphoric acid is good, but cheaper materials are available. Improved technology will undoubtedly lead to a better understanding of the erratic corrosion resistance of zirconium to certain industrially important acids.

SCOPE FOR HIGH STRENGTH ALLOYS

The possibilities of developing high-strength in zirconium by alloying are identical with those for titanium. For various reasons—such as cost, greater density and lower modulus of elasticity—it will be difficult for a structural zirconium alloy to compete with a structural titanium alloy. On the other hand zirconium has good potentialities for applications where both strength and corrosion resistance are required. Major improvements in the strength of zirconium alloys can be expected.

Because of its exceptionally good gettering properties, ductile zirconium is likely to be increasingly used in the

electronic industries. Its use as a getter for electronic tubes is well established, but will not become really extensive until zirconium alloys with improved high-temperature strength properties are developed. Because of its low coefficient of secondary emission zirconium is useful as a grid emission inhibitor. Zirconium foil from 0.0005 to 0.0002 in. is used as a flux in welding tungsten to tungsten, tungsten to molybdenum, molybdenum to molybdenum, and other combinations of metals. The foil is inserted between the metals and welded with an electric spot welder.

Another small, but very important, field that zirconium might enter, is the production of electrolytic condensers, which calls for a metal with excellent corrosion resistance and capable of giving a high-resistivity, high-dielectric-constant oxide film. Zirconium is also used to improve the efficiency of pumping systems, zirconium spirals being inserted between the pump and the electronic valve to be evacuated. It has been used successfully as a getter in the process whereby metals are plated by evaporation on to ceramics, plastics, glass and metals. Finally, investigations in America and France suggest that it is also particularly suitable for surgical purposes such as repair plates.

By sponsoring research on improved production methods and by financing production facilities, the A.E.C. has substantially increased the production of ductile zirconium in the United States. Before improved nuclear technology discovered that zirconium was one of the few low-cross-section metals, ductile zirconium was a rare metal, produced in small quantities by the de Boer process, which sold for \$300 per lb. Consequent on the increased production the price of crystal-bar has been reduced to about \$50 per lb., while magnesium-reduced sponge costs \$15 to \$20 per lb. If the cost of the metal could be brought down to \$8 per lb. in ingot form, non-nuclear demand in the United States might be expanded to 120 tons a year. If the price came down to \$2½, a non-nuclear demand of 1,500 tons annually might well result. The chief consumer would be the chemical industry with an estimated consumption of about 1,000 tons annually. Other consumers might collectively add another 500 tons.

REFRACTORIES AND OTHER COMPOUNDS

Zircon (zirconium silicate) has a well-established market in the refractory field and has other minor fields of application. Zircon refractories soften at about 2,000° C. and have a considerable margin of service-temperature range over silica, alumina, magnesia, and other less costly materials. The future outlook for zircon refractories is good and the market is expected to expand considerably. Collectively, the special applications for which zircon is used should constitute a tonnage market of 6,000 to 10,000 tons or more. The stabilized zirconia refractories suffer from the same handicap of being better than the refractory industry requires for the bulk of its applications, besides being heavy and expensive. Much of the cost originates in the raw material, and it is considered that before stabilized zirconia comes fully into its own as perhaps the outstanding refractory, the cost of producing ZrO_3 from zircon will have to be reduced sharply by improved technology.

Some applications have been developed for other zirconium compounds; for example, outstanding promise as a heat-resistant intermetallic compound for extreme high temperature use is being shown by zirconium boride. Various zirconium salts are now being produced in Britain on a small scale by F. W. Berk & Co. Ltd., but so far comparatively little work has been done in Britain to explore their possibilities.

Acknowledgment is made to the following sources: *Zirconium*, by G. L. Miller, Ph.D., B.Sc., A.R.I.C., M.I.Chem.E., F.I.M. (*Murex Review*, Vol. 1, No. 8, 51). *Resources for Freedom*, Vol. IV, *The Promise of Technology*.

REVIEWS

Encyclopedia of Surface-Active Agents, by J. P. Sisley, Ch.E. Translated from the French and revised by P. J. Wood. Published by the Chemical Publishing Co. Inc. of America. Pp. 540. Price \$15.00.

The author is general director of the Technical Institute of Studies and Research on Fatty Matters (France), and general secretary of the Association of Chemists of the Textile Industry (France), and the translator is technical director of the Royce Chemical Company.

The first portion of the work deals with the general aspects of surface-active agents, and states their properties, applications, and methods of manufacture. It presents also an efficient system of classification by which every variety of the modern surface-active agents can be identified by simple symbols. Among the chemicals included in this portion of the work are wetting agents, detergents, penetrants, foaming compounds, emulsifiers and dispersing agents. The book takes an inventory of all the sulphonated oils and modern detergents currently manufactured in all industrial countries and groups them into main and sub-classes according to their chemical composition, as well as describing their many applications in many industries, of which a use as flotation reagents is included.

The second portion of the work is a compilation of data on all major commercially available surface-active agents which appeared on the world market up to the publication of the book. For easy reference, these products are arranged in alphabetical order of their brand name.

Mining Machinery, by Thomas Bryson, A.R.T.C. (Glasgow), M.E., M.I.M.S. A third edition. Published by Sir Isaac Pitman and Sons Ltd. Pp. 508 with index and illustrations. Price 35s. net.

The work under notice was originally intended as a treatise on the generation, transmission, and utilization of power for the use of students for the Board of Trade examination for second-class certificates of competence as colliery managers. In preparing this third edition of the work, the opportunity has been taken to extend its scope to include a consideration of coal face machinery and locomotive transport, and to modernize the questions at the ends of chapters.

Within these pages, the study of each branch of the general subject of mining machinery is begun by a consideration of the leading principles upon which the further treatment is founded, with representative machines and appliances described. Of particular interest in the light of modern industrial development, is the fact that as the uses of typical mining plant are set forth consideration is given to the normal measures taken to ensure the safety of operators.

Throughout this work, the illustrations give a definite value to the whole, and make more lucid the descriptive force of the written matter. The permission of the Controller of H.M. Stationery Office was obtained to reproduce the examination questions included.

U.S. Geological Survey Fluorimetric Methods of Uranium Analysis, by F. S. Grimaldi, Irving May, and Mary H. Fletcher. Issued as Geological Survey Circular 199. Copies obtained without charge from Chief of Distribution, Geological Survey, Washington 25, D.C.

This manual describing fluorimetric methods of uranium analysis was issued during December 1952 by the United States Department of the Interior. The work is part of a programme investigating radioactive materials undertaken by the Geological Survey on behalf of the Atomic Energy Commission.

The book is intended as a guide for analysts interested in the determination of small amounts of uranium and includes a general discussion of the theory, practice, and instrumentation connected with fluorimetric methods. The methods presented have in common the measurement of the fluorescence of uranium in fluoride melts. Detailed procedures for the determination of uranium in rocks, minerals, low-grade ores, and waters are given, and complete shop drawings of two fluorimeters are presented.

MACHINERY AND EQUIPMENT

Hydraulic Transportation of Solids

Since the opening of its Harlow Laboratory in May 1951, the progress made by the British Hydromechanics Research Association has been very marked. The Association's Fifth Annual Report reveals a further expansion of staff and activities, together with a 15 per cent increase in membership.

Among the most spectacular activities is an investigation to determine the optimum economic condition for the transport of solids in pipelines. This work is sponsored by the N.C.B., who are primarily interested in the transport of coal, both in the pit and above ground, but it is thought that the results of the investigation will have applications in other fields such as ash handling, gravel digging and land reclamation. The factors involved in predicting the head loss and water velocity include the size distribution, shape, density and concentration of the material, and the diameter and slope of the pipe. Some success has been achieved by theoretical analysis of previously published data, but there are big gaps in the available knowledge. An experimental rig in which varying conditions can be circulated through a 3 in. experimental pipeline has accordingly been constructed to supply the missing information. Besides obtaining data of a fundamental nature for design purposes, the Association has constructed a small-scale experimental "coal pump" for continually injecting coal through the pump itself.

The sponsorship of the investigation of the mechanism of cavitation erosion carried out by Dr. Wheeler, of Mark Laboratories Ltd., has been transferred to the Mechanical Engineering Research Organization. The preliminary results obtained by Dr. Wheeler open up a promising line of possible future developments in reducing cavitation damage by inhibiting any initial corrosion. A small closed circuit cavitation tunnel having a throat about $1\frac{1}{2}$ sq. in. and a velocity up to 40 ft./sec. has been constructed.

A test rig for investigating the behaviour of self-acting valves on reciprocating pumps has been almost completed and experimental work will be started as soon as the necessary instruments have been assembled. The motion of the valve will be recorded by an electrical device which is frictionless and adds only to the inertia of the valve disc. The pressure changes in the cylinder will be measured by means of an electronic recorder able to respond to high-frequency oscillations. Theoretical work has been carried out on the operation of reciprocating pumps near top dead centre.

Europe's First Coal Pipeline for Western Germany

According to *Schlägel und Eisen*, the management of the Minister Achenbach colliery in Brambauer near Lünen, Westphalia, is planning to link up the colliery with Steinkohlen Elektrizitäts-A.G., Lünen, four kilometres distant, by means of a coal pipeline. Through this pipeline, the construction of which will cost about 2,200,000 to 3,000,000 DM, about 1,000 tons could be transported per day, a quantity which is approximately equal to that carried by 50 railway wagons.

The colliery management intends to establish by experiments whether this project can be made to work on an economic basis; should it decide to proceed, Western Germany would in fact possess the first coal pipeline in Europe.

Rubber Equipment for the Suppression of Vibration

Vibration in machinery is attracting increasing attention in industry, for this incessant movement damages the machinery itself, sometimes weakens the building structure, and almost invariably places a strain on workers to the detriment of health and efficiency.

The vibro-insulators made by the British Tyre and Rubber Co. Ltd. are claimed by the manufacturers to have brought about an advance in the technique of vibration suppression during recent years. This advance consists of the use of rubber in shear instead of compression for the absorption of unwanted frequencies. Rubber in shear absorbs a far wider range of disturbing frequencies more effectively than rubber under compression. It is suggested that the true virtue of rubber as an

absorber of vibration lies in its ample elasticity rather than in its negligible compressibility.

The vibro-insulator machinery mountings manufactured by B.T.R. are rubber spring bonded to metal supports and used in shear to provide considerable spring deflections. They are made in a range of sizes and designs to cover a wide field of applications from delicate scientific instruments to machines such as compressors and diesel generators. Their principal features are the maximum isolation of vibration from foundations and building structures, the complete cushioning of vibratory forces set up within the working machinery, and the nullification of the need for deep foundations so that much heavy machinery can now possibly be operated on upper floors.

Typical examples of these equipments are the Type 1 vertical shear mounting, suitable for heavy switchboards. The maximum static load is 500 lb. per unit with deflection 0.16 in. The Type 120 heavy machinery mounting incorporating the high deflection shear type tubular vibro-insulator is suitable for machinery over a wide range of operating speeds such as rotary driers, compressors, vibrating screens and grinding or pulverizing equipment. It is available in sizes for loads ranging from 250-1,500 lb. static, and the deflection is 0.63 in.

A Bulk Loader for Materials Handling

Based on the Matbro Series 2 of 2-ton fork truck chassis, the Mathew Brothers' Bulk Loader is fitted with large pneumatic tyres to improve its operation under difficult conditions of terrain. Yet despite these large units, the loader is claimed to be able to operate in intersecting aisles 8 ft. 6 in. in width. The machine may be fitted with any of the following equipments : $\frac{1}{2}$, 1, or $1\frac{1}{2}$ cu. yd. shovel, dozer blade, snow plough, fork lift attachment, crane jib and other attachments now under design. It may thus be considered as of potential value in quarrying, open cast mining, or surface dump operations.

Dimensional statistics show that the loader is 15 ft. 1 in. in overall length with bucket down and 14 ft. 9 $\frac{1}{2}$ in. in overall length when carrying a load. Its overall width on single wheels is 5 ft. 3 in. and on twin wheels 6 ft. 7 in., while its various heights are 7 ft. 8 in. minimum, 16 ft. 1 in. maximum and 9 ft. 9 in. maximum discharge. The minimum discharge reach is 3 ft. 3 in. and the maximum 5 ft., while the normal turning radius of the machine is 13 ft., reduced to 9 ft. 8 in. by use of steering brakes, and the load capacity is 2,500 lb. Full lift is achieved in 7 sec., and the machine can move at up to 15 m.p.h.

The engine is a New Fordson Major, 4 cylinder o.h.v., equipped with six forward and two reverse gears.

A New Recording Balance

New recording balances of robust industrial design have recently been developed in France by Testut, of Paris, with Griffin & Tatlock Ltd. as agents for the British Commonwealth. The balances draw a weight-time curve on a drum 150 mm. high by 240 mm. circumference and sensitivity may be as high as 1 mg. per mm. The time axis is determined according to the particular task, and some typical recent applications include the plotting of evaporation rates of mixed solvents at different temperatures, thermo-balance applications, the recording of gas density or specific gravity, and similar functions.

The balances operate on a new principle, by which the beam is continuously oscillating but is maintained in a state of dynamic equilibrium through a special platinum-gold contact attached to it, energizing a relay which controls a servo-motor. Equilibrium of the balance is restored on the Chainomatic principle by operation of the motor. The range of weight change recorded depends upon the sensitivity desired.

These units may be adapted for use with high temperature furnaces in controlled atmospheres, for recording weight change of specimens and for studying chemical reactions, and can also be supplied for use with low temperature ovens. A weight-time curve is normally recorded, but means can be provided for recording weight-temperature curves for special applications such as the thermo-analysis of steels and alloys. Importation into this country is subject to the granting of a Board of Trade licence.

METALS, MINERALS AND ALLOYS

In his message to Congress President Eisenhower has recommended that wage-price controls should not be renewed when they expire at the end of April, and that controls on materials and production should end on June 30, except for defence priorities and critical items essential for defence.

COPPER.—Copper continues tight in America due probably to the expectation of a rise in price following the decontrol announced by the President by April 30 next. Producers stocks at end December were 24,000 s.tons, the lowest for any year end since 1906. Developments elsewhere also point in the same direction.

The Chilean Congress has now passed a special Bill empowering the Central Bank for a further period, with the agreement of the President's nominees, to fix the prices at which the bank will buy copper from the producers. Moreover, the Central Bank's copper board is now freed from obtaining the assent of the companies to any change. The threatened strike of clerical workers at Chuquicamata was averted at the eleventh hour, presumably by their requirements being met. The Chilean government is also reported to have arranged a deal with the Argentine Minister of Trade for the shipment of 23,700 tonnes of semi-processed copper against 140,000 head of Argentine cattle. Possibly this deal may be more effective than previous ones between the Argentine and Bolivia with regard to tin.

Possibly with a view to insurance against declining supplies from Chile, it is rumoured in trade circles that the United States government is concluding an agreement with four Canadian producers for stockpile purchases of substantial quantities of Canadian copper on the basis of 30 c. per lb. for delivery over two years with options for a further term with an escalator price clause.

The U.S. Senate Finance Committee this week approved the Patterson Bill to continue the suspension of the copper import duty until June 30, 1954.

Mr. Guillebaud, in his wage increases award to the African miners in Northern Rhodesia is said to have added the rider that satisfactory, harmonious conditions will not be obtained on the copperbelt until African workers can obtain positions of greater responsibility and importance. The advances now granted are said to be 80 per cent in the basic pay for the lowest grade workers and 15 per cent for the highest; four hours' Sunday work is counted as a full shift, and additional hours paid for as double time; there will also be an extra 3d. per shift for afternoon and night shifts. The pay increases have been estimated to cost the companies £750,000 a year.

It has been announced in Melbourne that Mount Lyell expects to step up output from around 7,000 tons to-day to between 10,000 and 11,000 tons within five years. This, however, is less than in 1940. A company spokesman said that deeper levels can now be economically worked—presumably at current copper prices. The life of the mine should be, on present knowledge, not less than 22 years—again, presumably at around current prices and wage rates.

Production of copper in Turkey is said to be growing in importance and there are favourable reports of recent discoveries in the Balikessir region. It is hoped to export some £35,000,000 worth of concentrates in the current year.

LEAD.—The A.S. and R. surprised the market by cutting the price of lead to 13½ c. at the beginning of this week, but London prices did not follow suit, the effect of the termination of the Broken Hill smelter strike having been discounted.

The Yugoslav lead output for last year is reported from Belgrade to have reached 67,500 tonnes as against 60,068 in 1951 and 10,650 tonnes in 1939.

TIN.—A rather firmer tone has characterized the Metal Exchange prices for spot to which the prospect of the lifting of control in America no doubt contributed, but the backwardation has increased.

Exports from Malaya last January were higher at 5,759 tons according to the Straits Trading Company. The United States became again by far the largest importer, taking 3,350 tons, the Continent 1,505 tons, Canada 215 tons, and U.K. 85 tons and other destinations 604 tons.

Shipments of Indonesian tin concentrates in December were 3,462 tons making a total of 34,191 tons for the year as compared with 30,490 tons for 1951. Since March last the United States has taken 8,107 tons of Indonesian material. The five year contract between the Billiton Company and the Banka Administration for the technical administration of the Banka mines is due to terminate on March 1 next. What arrangements may be reached thereafter is unknown but in general it is thought that the Indonesian government is anxious to extend its control over the tin industry generally.

The output of the Belgian Congo in 1952 is reported as 13,320 tons (13,669 in 1951), and of Indonesia 35,003 tons (30,986 in 1951).

As regards the new agreement between Williams Harvey and the Bolivian Mining Corporation it is now understood that prices are likely to be on a sliding scale. Many further police arrests are reported from La Paz this week.

A Bill has been introduced in U.S. Congress by a Texan representative providing for the maintenance of an adequate domestic tin smelting industry. The proponent of the Bill is understood to favour the eventual transfer of the smelter to private enterprise but in such an event tariff protection would be necessary.

Secondary tinplate exports from the United States are no longer to be subject to export quotas though export licences will still be required. Tin plate output will still be subject to quota restrictions.

The next meeting of the Tin Study Group is to be held in London some time in March.

ZINC.—The reduction in the American quotation to 12 c. last week failed to stimulate sales and Metal Exchange quotations have since declined to £83/£83 5s. for current month, the lowest quotations since the free market in zinc was established in the beginning of the year. On Wednesday last, the U.S. price was further cut by some producers to 11½ c. French zinc smelters have also lowered their prices.

Yugoslav zinc production last year rose to 14,300 tonnes—about three times the pre-war figure. It is hoped to improve this output to a rate of 25,000 tonnes annually in the near future. The new electrolytic plant under construction at Sabac will, it is hoped, be completed by the end of the year, with a capacity of 12,500 tons of zinc.

ALUMINIUM.—Big increases are foreshadowed in the world production of this light metal. The Defence Production Administration in Washington has announced the completion of arrangements for the construction of a \$70,000,000 plant to be sited probably in the Tennessee Valley; at any rate the power will be supplied by the T.V.A. The Wheland Company of Chattanooga is to construct a 50,000 s.ton capacity plant to produce primary aluminium. This brings the number of basic aluminium producers to seven.

Alcan has announced the shipment to the United States almost immediately of 22,000 s.tons of aluminium previously allocated to Great Britain. This will be in addition to the normal Canadian metal loaned to the United States under the arrangement with Great Britain announced towards the end of last year. The extra supplies will be divided between Alcoa, Kaisers, and Reynolds.

It is announced from New York that Mr. Adrian J. van Staalem, a United Nations expert is to visit British Guiana at the request of the government of the colony to study the practicability of developing hydro-electric power, more particularly to process the bauxite resources of the colony. The harnessing of the Kaietur Falls has long been a favourite project in British Guiana but whether any future power developed will be based upon them is not yet known.

TUNGSTEN.—Following on the general cessation of buying by consumers reported last week, British Tungsten Limited reduced their buying prices on Monday by 40s. per unit to 330s. c.i.f. for wolfram and 320s. for scheelite, and their selling prices by the same amount to 352s. 6d. and 342s. 6d. delivered respectively. Prices have now been steadily falling since July.

1951, when the wolfram price was 52s. per unit. The Ministry is generally believed to hold satisfactory stocks of tungsten ore and should offers from producing countries fall off, they are well placed to meet the decline. It may be recalled that before the Korean trouble started, in the middle of 1950, the price was around 130s. per unit.

In the U.S. the open price has been reduced to \$44.46 from the previous figure of \$46.50-48.

QUICKSILVER.—The U.S. price has been further reduced to \$208-210 per flask.

GOLD.—Mr. Butler stated in Parliament on Tuesday that the Sterling area had a gold and dollar surplus of \$132,000,000 in January and that the central gold and dollar reserves for the area had improved to \$1,978,000,000 at the end of last month. Gold stocks in the United States at the end of January were \$23,036,000,000. This compares with \$23,290,000,000 a year earlier. The Japanese Finance Ministry has varied the Government's buying and selling gold prices in order to encourage gold mining, improving the gold mines margin on transactions to 6 yen per gramme.

SILVER.—The Japanese Government continues to dispose of its stock of silver and last week shipped 52 tons of bullion to the U.S. on a contract basis—additional to some 200 tons shipped last year on consignment to New York and London.

Iron and Steel

Fulfilment of the promise of ample supplies of steel for all purposes may be deferred for a longer period than was envisaged at the turn of the year. There has been no recession in production. The January output figures are expected to compare favourably with those of the last quarter of 1952. What has modified the view of the optimists has been the recent revelation of the enormous extent of the back logs. Many of the mills have yet to deliver big tonnages of material originally authorized for Period IV of last year. Hence, deliveries are still in arrears and the full benefit of the increased allocations for the current quarter have not yet been felt.

The rising trend of pig iron production is backed by ample supplies of home and foreign ores, but coking capacity is strained to provide the extra tonnages of high grade coke for the blast furnaces. Moreover, one blast furnace in the North of England has been transferred from hematite to basic iron production to meet the requirements of the steel plant and in consequence there has developed an acute shortage of hematite iron, which creates embarrassments for the engineering and speciality foundries. This has already had the effect of swelling the demand for low and medium phosphorous iron, supplies of which are very limited.

Many of the re-rolling establishments are also working on very slender stores of semi-finished steel and scrap. The acceleration of deliveries from the British steel works has been so slight as to be almost imperceptible and it seems to be premature to talk of any reduction in the tonnages imported from the Continent.

There seems to be a rather more active tendency in the export branch of the steel trade, which may develop as the Spring advances. But at present the steel makers are concentrating chiefly upon the urgent needs of British industries. However, some fairly substantial orders have been booked for black and galvanized sheets, for which overseas buyers are prepared to pay substantial premiums over and above the fixed home prices, and also for railway equipment. On the other hand, British prices for re-rolled bars and light sections are far too high to command much attention in overseas markets. The aircraft industry is making heavy demands upon the output of alloy steels and it is hoped shortly to bring production into closer relationship with an expansion of demand which promises to be of a permanent character.

The London Metal Market

(From Our Metal Exchange Correspondent)

The feature of the tin market has been the increase in the backwardation, which is partly technical and partly due to slightly better consumer demand. With stocks in Metal Exchange warehouses decreasing, it seems probable that the general price level will rise to an extent which permits the shipment of Straits tin to the U.K. without loss. The Eastern price on Thursday morning was equivalent to £959 10s. per ton c.i.f. Europe.

Early in the week the lead market was without interest, and drifted downwards on receipt of the news that the American price had been reduced by ½ c. per lb. Later, more enquiries were received from consumers and the undertone was better.

The zinc market still appears to be without friends and the weakness in the American quotation was reflected over here. Consumer interest is still slight, and it seems probable that the price will have to fall further before any kind of stability is reached.

The copper market in the U.S. remains firm, and a number of consumers have bought more than their actual needs at the present price level for fear that the Chilean authorities will decree an increase in the selling price of their copper. In marked contrast the European copper market is lifeless, and smelters are unwilling to take in refining material on basis of the existing prices which are around 35 c. per lb. ex works or slightly under the equivalent sterling at the official rate.

Closing prices and turnover for the week are given in the following table:

	January 29 Buyers	January 29 Sellers	February 5 Buyers	February 5 Sellers
Tin				
Cash	£963	£964	£974	£976
Three months	£944	£945	£948	£949
Settlement		£963		£975
Week's turnover....		175 tons		375 tons
Lead				
Current month	£961	£96½	£95½	£96
Three months	£93½	£93½	£93	£93½
Week's turnover....		5,750 tons		3,625 tons
Zinc				
Current month	£85	£85½	£83	£83½
Three months	£85½	£85½	£83½	£83½
Week's turnover....		3,300 tons		4,900 tons

FEBRUARY 5 PRICES COPPER

Electrolytic £285 0 0 d/d

TIN, LEAD AND ZINC

(See our London Metal Exchange report for Thursday's prices)

ANTIMONY

English (99%) delivered, 10 cwt. and over .....	..	..	£225 per ton
Crude (70%)	£210 per ton
Ore (60% basis)	20s. — 22s. nom. per unit, c.i.f.

NICKEL

99.5% (home trade)	£483 per ton
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OTHER METALS

Aluminium, £166 per ton		Osmiridium, £40 oz. nom.
Bismuth (min. 5 cwt. lots) 17s. 6d. lb.		Osmium, £65/£70 oz. nom.
Cadmium (Empire), 14s. 4d. lb.		Palladium, £7 15s./£8 10s. oz.
Chromium, 6s. 5d./7s. 6d. lb.		Platinum, £27/£33 5s.
Cobalt, 20s. lb.		Rhodium, £42 10s. oz.
Gold, 248s. f.o.z.		Ruthenium, £25 oz.
Iridium, £60 oz. nom.		Quicksilver, £70 10s./£71 ex-warehouse
Magnesium, 2s. 10½d. lb.		Selenium, 30s./30s. 6d. nom. per lb.
Manganese Metal (96%-98%)	£280/£295	Silver 74d. f.o.z. spot and f.d.
		Tellurium, 18s./19s. lb.

ORES, ALLOYS, ETC.

Bismuth .....	..	65% 9s. 9d. lb. c.i.f.
		20% 4s. 6d. lb. c.i.f.
Chrome Ore—		
Rhodesian Metallurgical (lumpy)	..	£13 2s. per ton c.i.f.
" " (concentrates)	..	£13 2s. per ton c.i.f.
" " Refractory	..	£12 14s. per ton c.i.f.
Baluchistan Metallurgical	..	£14 15s. 6d. per ton c.i.f.
Magnesite, ground calcined	..	£26 - £27 d/d
Magnesite, Raw .....	..	£10 - £11 d/d
Molybdenite (85% basis) .....	..	103s. 10½d. per unit c.i.f.
Wolfram (65%) .....	..	330s. c.i.f. U.K. buying
" " .....	..	352s. 6d. Selling
Scheelite .....	..	320s. c.i.f. U.K. buying
" " .....	..	342s. 6d. Selling
Tungsten Metal Powder .....	..	30s. 8d. nom. per lb. (home) (for steel manufacture)
Ferro-tungsten .....	..	25/3-25/9 nom. per lb. (home)
Carbide, 4-cwt. lots .....	..	£35 13s. 9d. d/d per ton
Ferro-manganese, home .....	..	£48 12s. 11d. per ton
Manganese Ore U.K. (48% - 50%) .....	..	6s. 1d. per unit
Brass Wire .....	..	2s. 8½d. per lb. basis
Brass Tubes, solid drawn .....	..	2s. 2d. per lb. basis

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

The week started with a great burst of activity but trading eased away as news of the flood disaster came in. While this caused quieter conditions, markets generally encountered only a small amount of selling and profit-taking. The Southern Rhodesia Loan referred to last week was a failure, 77 per cent of the stock being left with the underwriters. This only had a temporary damping effect on the market and better savings figures, high revenue returns, and a good increase in the gold and dollar reserves all had their effect in cheering gilt-edged. It is interesting to note that sterling has now reached its official maximum of \$2.82 to the £ and the Bank of England has begun selling sterling against dollars.

The Kaffir market had an interesting and lively week. Most shares started with active trading conditions and although these quietened down, only a certain amount of profit-taking was encountered and the general undertone remained firm. Among finance houses, Consolidated Goldfields were outstanding. The latest Rand returns show that many of the companies in this group have recorded improved figures. On the far West Rand, Strathmore were also a feature and W.R.I.T.S. went ahead on the good returns from West Driefontein and Doornfontein. Among individual mines, West Rand Consolidated were outstanding. Detailed returns show that the initial income from uranium is more like 1s. 9d. a share as opposed to the previous estimate of between 9d. and 1s. This immediately encouraged all other known potential producers, and rumours are in strong circulation concerning other companies which may join the list. East Daggafonteins and Marievale have been mentioned. Investors clearly consider that uranium production is likely to give a sound backing to gold producers and the possibility of a future alteration in the dollar price of gold adds spice to the dish. In this connection, Mr. Havenga has made another speech pointing out that one of the main difficulties of the sterling area has been the dollar price of gold which has not changed since 1934. The Vinterspost January returns show marked improvement and the good Ellaton figures affected all interested companies.

In the O.F.S., the Freddies group were outstanding. There was talk of good development results so far unannounced and support by the "shop" is rumoured. The St. Helena returns for January show that the mine has now reached the stage of milling 60,000 tons a month. There were strong rumours that the basal reef shows substantial uranium content throughout the O.F.S. field. These are so far unconfirmed.

West Africans quietened down but considerable interest has been shown in the improving returns. Ashanti reported high values at the bottom level of the mine and latest figures from Ariston show a sound technical position with regard to ore reserves. Bremang recorded a small profit for January and better returns are expected when No. 4 dredge enters payable ground. No. 3 dredge was laid up for repairs for nearly a month during the past quarter. Figures from Gold Coast Main Reef were also encouraging.

Diamond issues declined, aided by selling from Paris. The maintained Anglo-American Trust dividend in the face of higher profits disappointed the market.

Coppers were steadier. Buyers came in for Chartered and Selection Trust. It is hoped that the new wage award may stabilize costs in Rhodesia for some time to come.

Lead/zinc issues eased on the lower metal prices. Mount Isa's copper plant is expected to begin operations this week.

Beralt Tin fell on the reduction in the price of tungsten and Murchison dropped in anticipation of the quarterly report expected shortly.

Asbestos and manganese shares were again bought, the former mostly on investment demand.

Among Canadians, Rix-Athabasca shares constitute the first privately owned uranium mine to come on the market. After opening at \$4½ they finished the week at \$5½. Dome Mines have also acquired an interest in uranium. International Nickel paid a maintained quarterly dividend of 50 c. U.S.

FINANCE	Price Feb. 4	+ or - on week	O.F.S.	Price Feb. 4	+ or - on week	MISCELLANEOUS GOLD (contd.)	Price Feb. 4	+ or - on week	TIN (Nigerian and Miscellaneous contd.)	Price Feb. 4	+ or - on week
African & European	23	+ 1	Freddies	12/3	+ 7d	St. John d'El Rey	27/9	- 9d	Geevor Tin	14/9 XD	+ 1 1/2
Anglo American Corp.	63	+ 3	Freddies N.	13/3	+ 1	Zams	35/-	- 9d	Gold & Base Metal.	3/13	- 7 1/2
Anglo-French	19/9	+ 1/9	Freddies S.	13/3	+ 1	DIAMONDS & PLATINUM	4 1/2	- 9d	Jantar Nigeria	12/7	- 7 1/2
Anglo Transvaal Consol.	26/3	+ 2/6	F. S. Geduld	2 1/2	+ 1/2	Anglo American Inv.	4 1/2	- 9d	Jos Tin Area	10/3 XD	- 7 1/2
Central Mining (£1 shrs.)	33/9	- 7d	Geoffries	16/3	+ 3d	Casts	25/6	- 9d	Kaduna Prospectors	3/3	- 1 1/2
Consolidated Goldfields	50/-	+ 2/3	Harmony	21/3	+ 9d	Cons. Diam. of S.W.A.	4 1/2	- 9d	Kaduna Syndicate	3/7	- 1 1/2
Consol. Mines Selection	27/6	+ 7d	Lorraine	7/10 ^{1/2}	+ 1/3	De Beers Pd. Bearer	72/3	- 9d	London Tin	5/6	- 1 1/2
East Rand Consols.	2/9	+ 4/4	Lydenburg Estates	10/-	+ 9d	De Beers Pd. Bearer	14/-	- 9d	United Tin	2/6	- 1 1/2
General Mining	4 1/2	+ 1/2	Merriespruit	6/-	+ 9d	Poto Platinum	10/-	- 1 1/2	SILVER, LEAD, ZINC		
H.E. Prop.	33/9	+ 3/9	Middle Wits	16/3	+ 3d	Waterval	17/-	+ 6d	Broken Hill South	45/7 ^{1/2}	- 11d
Henderson's Transvaal	8/9	- 3d	Ofsits	40/-	+ 1/10	Burma Mines	2/-	+ 9d	Consel. Zinc	27/9	- 11d
Johnnies	53/9	+ 7d	President Brand	20/-	+ 10d	George	14/9	+ 9d	Mount Isa	38/6	+ 6d
Rand Mines	44	+ 8	President Steyn	20/-	+ 1/10	Messina	22/6	- 9d	New Broken Hill	58/9	- 6d
Rand Selection	37/6	+ 7d	St. Helena	15/-	+ 3d	Nchanga	51/9	- 6d	North Broken Hill	13/10 ^{1/2}	- 3d
Strathmore Consol.	32/-	+ 5/-	U.F.S.C. & G.	8/6	+ 3d	Rhod. Anglo-American	11/-	- 6d	Rhodesian Broken Hill	24/10 ^{1/2}	+ 4 1/2
Union Corp. (2/6 units)	33/-	- 3d	Virginia Ord.	13/3	+ 1/3	Rhod. Katanga	20	+ 1/4	San Francisco Mines	3/10 ^{1/2}	- 3d
Vereeniging Estates	4 1/2	+ 3/2	Welkom	21/6	+ 1/7 ^{1/2}	Rhodesian Selection	15/4 ^{1/2}	+ 1/4	Ururiwa		
Writs	32/6	+ 1/6	Western Holdings	3 1/2	+ 1/6	Rhokana	25	+ 1/4	SILVER, LEAD, ZINC		
West Wits	46/10 ^{1/2}	+ 7d				Rio Tinto	13/9	- 1d	BASE METALS & COAL		
RAND GOLD			WEST AFRICAN GOLD			Roan Antelope	38/9	- 1d	Amal. Collieries of S.A.	45/6	- 6d
Blyvoors	43/9	+ 3d	Amalgamated Banket	1/9	+ 1	Selection Trust	62/6	- 2/6	Associated Manganese	49/3	- 6d
Brakpan	15/7 ^{1/2}	+ 3d	Aristedt	6/10 ^{1/2}	+ 1/2	Tanks	41/3	- 3d	Cast Asbestos	20/9	- 1/2
City Deep	30/7 ^{1/2}	- 7d	Ashanti	25/-	+ 1/2	Tharsis Sulphur Br.		- 1/3	C.P. Manganese	53/6	- 1/2
Consol. Main Reef	31/3		Bibiani	7/3	+ 1d	TIN (Eastern)		- 3d	Consol. Murchison	32/9	- 3 1/2
Crown	40/7 ^{1/2}		Bremang	2/4 ^{1/2}	+ 1d	Ayer Hitam	28/6	- 3d	Mashaba	8d	
Daggas	3 1/2	+ 3/2	G.C. Main Reef	4/- XD	- 4d	Bangri	7/9	- 3d	Natal Navigation	3d	
Doorfontein	28/6	+ 9d	G.C. Selection Trust	7/3 XD	- 4d	Gopeng	11/-	- 3d	Rh. Montelco	10/7 ^{1/2}	- 9d
Durban Deep	2 1/2	+ 2/-	Konongo	3/-	+ 1d	Hongkong	8/3	+ 9d	Turner & Newall	104/9	- 9d
E. Daggas	21/-	+ 2/-	Lydhurst Deep	1/3	+ 1d	Ipoh	19/6	+ 3d	Wankie	15/4 ^{1/2}	- 1d
E. Geduld .. (4/- units)	40/-	+ 7d	Marlin	1/3	+ 1d	Kamunting	12/3	+ 3d	Witbank Colliery	56/3	
E. Rand Prods	38		Taqua & Abossa	4/3	+ 1d	Kpong Dredging	6/-	+ 1d	CANADIAN MINES		
Geduld	58	- 16				Kinta Tin Mines	14/-	- 6d	Dome	\$36 ^{1/2}	- 1d
Govt. Areas	15/9	+ 1/-	AUSTRALIAN GOLD			Malayan Dredging	25/-	- 6d	Hollinger	\$30	
Grootvlei	27/9	- 2/-	Boulder Perseverance	2/3	+ 3d	Pahang	15/6	- 6d	Hudson Bay Mining	\$108	+ 1/2
Libanon	11/3	+ 6d	Gold Mines of Kalgoorlie	12/6	+ 6d	Pengkalan	10/3	- 6d	International Nickel	\$80 ^{1/2}	- 6d
Luipaards Vlei	26/-	+ 3/-	Great Boulder Prop.	7/- XD	- 3d	Petaling	14/13	- 6d	Mining Corp. of Canada	\$41	- 6d
Mariveale	22/6	+ 2/3	Lake View and Star	16/9	+ 3d	Rambutan	13/-	- 3d	Noranda	\$146	+ 1/2
Modderfontein East	20/-		Mount Morgan	12/6	+ 6d	Siamese Tin	22/9	- 9d	Quemont	\$7 ^{1/2}	- 1d
New Kleinfontein	25/7 ^{1/2}	- 7d	North Kalgurlie	12/6	+ 6d	Southern Kinta	15/10 ^{1/2}	- 9d	Yukon	4/6	
New Pioneer	14/9	+ 3d	Osns of Gwalia	8/-	+ 3d	S. Malayan	26/3	- 9d	OIL		
Randfontein	32/3	+ 3/6	South Kalgurlie	7/3	+ 3d	S. Tronoh	12/-	- 4d	Anglo-Iranian	5 1/2	- 1d
Robinson Deep	11/6	+ 3d	Western Mining	11/9	+ 1/1	Sungei Kinta	19/-	- 4d	Apex	41/3	- 1d
Rose Deep	21/-					Tekka Taiping	8/4 ^{1/2}	- 4d	Attock	26/3	- 7 1/2
Simmer & Jack	6/3		MISCELLANEOUS GOLD			Tronoh	24/3	- 4d	Burmah	43/9	- 6d
S.A. Lands	31/10 ^{1/2}	+ 4/4	Can and Motor	9/3	- 6d	TIN (Nigerian and Miscellaneous contd.)		- 9d	Canadian Eagle	31/6	- 6d
Springb.	6/10 ^{1/2}		Champion Reef	6/-	- 6d	Amalgamated Tin	10/3	- 9d	Shef. (bearer)	20/4 ^{1/2}	- 6d
Stoffstein	26/6	+ 1/9	Falcon Mines	8/-	+ 3d	Bear. Tin	28/3	- 9d	T.P.D.	27/-	- 6d
Sub Nige.	52/6	+ 1/3	Globe & Phoenix	23/9	+ 3d	Biuchi	5/-	- 3d	Ultramar	25/4 ^{1/2}	
Van Dyk	9/1	- 3d	G.F. Rhodesian	6/6	+ 3d						
Venterpost	16/6	+ 1/-	London & Rhodesian	5/1 ^{1/2}	+ 1/10						
Vlakfontein	18/-	+ 1/2	Metopa	1/9	+ 1/10						
Vogelstruisbul	33/-	+ 2/-	Mysore	3/-	- 3d						
West Driefontein	6 1/2	+ 1/6	Nundydroog	6/-	- 3d						
W. Rand Consolidated	37/6	+ 2/6	Oregum	3/4 ^{1/2}	- 1d						
Western Reefs	46/10 ^{1/2}	+ 2/6	Orovile	11/6	+ 6d						

RAND AND ORANGE FREE STATE RESULTS FOR DECEMBER QUARTER

The interesting stage reached by several mines, especially those in the O.F.S. would in any case have lent importance to the December 1952 quarterly reports, but interest was further heightened by the extremely encouraging earnings from uranium reported by West Rand Consolidated, which augers well for the prospects of the other mines with uranium contacts.

Those companies which end their year with the calendar gave ore reserve estimates, most of them recording the familiar contraction. Although in no case could the depletion be regarded as serious, it was noticed that Randfontein's reserves are now down to less than a year's mill supply. Those of Grootvlei, Marievale, South African Land, Western Reefs, Vlakfontein and "Vogels" are higher, but the estimates generally reflect the influence of several variable factors.

Broadly speaking, working costs were higher at the end of 1952 than a year earlier. This fact alone would account for some decline in reserve tonnages through the elimination of ore not payable under present conditions. A reference back to the returns of the Transvaal Chamber of Mines shows that over the year 1952 average aggregate costs of the Rand mines rose from 33s. 4d. per ton in January to 35s. in December—a rise of 1s. 8d. compared with an advance of 2s. 9d. in the previous year, thus affording evidence of some flattening, at least, in the rate of the climb.

A drop in gold premium revenue had been anticipated owing to the lowering of the free market price, especially towards the end of last year.

The end-year Native labour figures emphasized the more efficient manner in which available labour is being utilized. The number of African workers employed had fallen to 267,938—the lowest for almost four years.

ORANGE FREE STATE PROGRESS

Amongst the most interesting O.F.S. quarterlies of the Anglo American group were those of Western Holdings and Welkom Gold. The latter gave an estimate of its first ore reserves—974,200 tons with an average value of 5 dwt. over 50 in. or 250 in. dwt. Of the 3,360 ft. sampled during the period, 61 per cent proved payable, value 348 in. dwt. Western Holdings reported near-100 per cent payability (98.75) for the 1,605 ft. sampled, value 638 in. dwt. The plant continues to operate for metallurgical and test purposes and it may be that before official gold production starts, connection between the two shafts may be deemed expedient. The haulage being extended from No. 1 shaft towards the boundary with Free State Geduld is now approximately 3,590 ft. (or less than $\frac{1}{4}$ mile) from the boundary. This latter reported that a concrete plug is being inserted to seal off the 5,350 ft. level where a fresh inrush of water had occurred. (See *Mining Journal* January 23, 1953.)

President Steyn reported that milling for metallurgical test purposes was going forward, and of the 1,170 ft. of development sampled, 79 per cent was payable, value 372 in. dwt. Good progress is being made with the Reduction Plant at President Brand.

At Lorraine Gold, No. 1 shaft has reached a depth of 5,258 ft. and No. 2, 3,717 ft. Winding plant, machinery and compressors are being installed.

The quarterly reports of the "Johnnies" group yielded the very interesting information that at the North and South mines payability was nearly 100 per cent. Footage at Freddie's South was considerably larger than at the North mine, and of the 1,455 ft. sampled, 99.3 per cent was payable averaging 14.5 dwt. over 31 in., equal to 450 in. dwt. The sister company, Freddie's North sampled, 755 ft., of which 97.3 per cent was payable averaging 15.8 dwt. over 26 in., or 411 in. dwt. Both companies announced that their reduction plants have been completed and that mechanical and metallurgical tests have been carried out with satisfactory results. Free State Development (Freddie's) reported that borehole ERK 1 on the western boundary of Freddie's North gave 0.2 dwt. over 13 in. in the second deflection from a reef at 6,078 ft. uncertainly correlated as the Basal.

Underground development was extended at Virginia O.F.S.

(Anglo Transvaal) but results were much less favourable than in the preceding quarter. Of 835 ft. sampled, 43 per cent was payable averaging 7.08 dwt. over 44.8 in. or 317 in. dwt. In the September quarter payability was 71 per cent and values 321 in. dwt. Development from No. 1 shaft was stopped temporarily early in November in order to expedite the sinking of the shaft to its final depth of 3,633 ft., and it was confirmed that the Basal reef was intersected at 3,562 ft. Work on the reduction plant, temporarily suspended last March, is now being resumed. Middle Wits reported drilling operations on various farms.

New Consolidated Free State announced that in its first deflection, borehole DS2 on farm Dirksburg 358, drilled jointly with Anglo American Corporation, intersected the Basal reef at 6,083 ft., assaying 27.4 dwt. over a corrected width of 28.7 in., or 786 in. dwt. Second deflection gave 12.3 dwt. over 29.4 in., equivalent to 362 in. dwt. Core recovery was almost complete in both instances. These follow basal reef values of 485 in. dwt. in original intersection. It has been suggested for some time past that there is a lease area in the making in the area north of Harmony and east of President Steyn, and these results must tend to strengthen the expectation that here the Gold Fields will in due course have its first developing mine in the O.F.S.

A further improvement in reef payability was recorded by St. Helena (Union Corporation). Of the 15,563 ft. developed, 8,490 ft. were sampled, giving a pay ratio of 51 per cent against 46 per cent previously. A pleasant surprise was provided by the ore reserve estimate; the figure of 1,250,000 tons being double that of the previous computation. Value of 5.3 dwt. is slightly lower.

No development on reef was done during the quarter from Harmony Gold Mining (Central Mining). The ventilation shaft was sunk to a final depth of 4,729 ft.

"Geoffries" (General Mining) disclosed little of outstanding interest. Drilling took place on Spes Bona 921.

RAND PRODUCERS RESULTS

Tonnage and yield figures to December for all producing mines were reported in the *Mining Journal* of January 16, page 78, and will therefore not be repeated here.

Central Mining—Rand Mines Group.—Most of the "Corner House" mines did a lower footage of development last quarter. The pay ratio of Blyvoor's 3,620 ft. sampled was disappointing; it was down to 89 per cent against 100 the previous quarter and 97 per cent in the June three months. Value, however, was up to 647 in. dwt. compared with 557 in. dwt.

A drop in Consolidated Main Reef's payability was also accompanied by lower value; of the 8,900 ft. sampled 37 (against 39) per cent was payable and the value dropped from 303 to 223 in. dwt.

City Deep opened up a slightly bigger area of ground and sampled 6,525 ft. compared with 5,650 ft. Pay ratio, however, was only 27 per cent, against 31 but value of 297 in. dwt. was slightly better. Of the 15,170 ft. sampled on Crown Mines, 58 against 60 per cent proved payable averaging 376 compared with 369 in. dwt.

The high pay ratio announced by Durban Deep in the September quarter was not maintained during the last three months of the year; of the 12,450 ft. sampled, 63 per cent (against 80) was payable, giving a lower average of 255 in. dwt. (346).

A good showing was again made by East Rand Proprietary. Although development was not on the high plane of the previous quarter the footage sampled of 3,810 gave 73 (against 71) per cent payability with value rising to 430 in. dwt. (398).

The average value of Modder East's 2,988 ft. sampled was the same as previously—174 in. dwt., with the percentage payable rising to 23 against 16. Rose Deep did less development and of the 6,300 ft. sampled, 27 per cent (against 36) was payable, value being 291 compared with 322 in. dwt. Welgedacht sampled only 695 ft. compared with 1,275 but the pay ratio rose to 40 against 27, averaging 148 (115) in. dwt. Transvaal Gold's payability rose from 35 to 62 per cent, but value was down.

Anglo American Corporation.—A slightly lower footage of development was reported by the Rand Mines of the Anglo American group.

No news of any reef development was contained in Vaal Reef's return, but this was as expected. All the footage accomplished (5,962 ft.) from the shaft sunk jointly with Western Reefs was in country rock. On this latter mine 19,085 ft. were developed of which 10,535 were sampled, giving a pay ratio of 42 per cent, value 335 in. dwt.

It was reported by Daggafontein that the uranium and acid plants are expected to come into operation during the current quarter. Development on both the Main Reef Leader and Kimberley reefs opened up satisfactorily. On East Daggafontein, pay ratio of the 5,600 ft. sampled on Kimberley dropped from 21 to 13 per cent with value of 230 against 237 in. dwt.

Of the 16,214 ft. developed on Brakpan, 11,900 ft. were sampled, giving a pay percentage of 35 (against 29) and value 524 in. dwt. (673). Both payability and value at Springs Mines improved; 7,803 ft. were developed, of which 7,230 was sampled giving a pay ratio of 43 per cent and value 426 in. dwt. (against 39 per cent and 327 in. dwt.). In its computation of ore reserves at the end of the year a small tonnage was given as being on the Kimberley Reef horizon.

South African Land developed 17,826 ft. of which 10,150 ft. were sampled with a pay ratio of 34 per cent (against 35) and value 391 compared with 444 in. dwt. More sampling was done on Western Reefs—10,535 ft. of the 19,085 ft. developed—and while payability was slightly better (42 against 41 per cent), values showed a slight decline at 335 in. dwt., compared with 348 in the previous quarter.

Consolidated Gold Fields.—Both development and footage sampled by members of the Gold Fields group showed some irregularity but payability generally was satisfactory.

Good values and high reef pay ratio were announced by Doornfontein. Development from the Annan shaft expanded considerably and of the 3,455 ft. of reef sampled, 90 per cent (against 75 per cent) was payable with an average value of 10 dwt. gold per ton over an estimated stoping width of 45 in. or 450 in. dwt.

The whole of the 2,815 ft. sampled on West Driefontein proved payable and averaged 17.3 dwt. over a stoping width of 45 in. equal to 779 in. dwt. In the previous quarter, payability was also 100 per cent and the value 680 in. dwt. The mine's No. 2 shaft has reached its final depth of 5,618 ft.

On Libanon, payability was 62 against 63 per cent but value was better at 333 in. dwt. (289). Vinterspost also announced rather better value—376 against 357 in. dwt., though pay ratio of 41 per cent was rather lower.

Of the group's Far Eastern producers, Vlakfontein reported that No. 2 shaft had been sunk 894 ft. to a total depth of 2,479 ft. Of the 7,765 ft. sampled, 31 per cent was payable, value 340 in. dwt. On "Vogel's" payability was slightly down—52 against 54 per cent—but value rather better at 329 in. dwt. Sub Nigel's pay ratio of 32 per cent was slightly lower and value of 360 in. dwt. went against 399.

Amongst the older mines, Luijpaards Vlei developed 20,293 ft., of which 6,927 was carried out to explore the Bird reefs which are being opened up to supply uranium. The projected plant is being financed from loan funds. Payability on Robinson Deep and Simmer & Jack was rather lower but value on this latter was better. Rietfontein's return was not so good as in the previous quarter.

Union Corporation.—All the members of the Union Corporation opened up a lower footage of ground last quarter but there was an improved showing in payability and value on most of the mines.

The Main reef pay ratio on East Geduld rose to 68 per cent against 40 and value 225 compared with 190 in. dwt. This was from the footage of 1,555 sampled, whereas previously it was 2,310 ft. The Black reef on Geduld was opened up to the extent of 4,050 ft. and of the 3,185 ft. sampled, only 13 per cent (against 21) proved payable, averaging 168 compared with 214 in. dwt.

Of the 9,075 ft. sampled by Grootvlei, 43 per cent against 46 was payable, giving a value of 238 (176) in. dwt. The June quarterly pay ratio figure was 55 per cent, averaging 220 in. dwt.

Sampling of the two reefs worked by Marievale disclosed better payability. 3,030 ft. of the Main reef was sampled giving

52 (against 36) per cent pay ratio, value 312 (367) in. dwt. The pay ratio of the 1,400 ft. sampled on the Kimberley was almost double that of the previous quarter—32 against 17 per cent, value being 230 compared with 177 in. dwt. Development on both reefs was, however, less than in the previous quarter.

On Van Dyk, a larger footage was sampled—7,325 against 6,540. Payability came out at exactly the same figure as in the September three months—40 per cent, with a slightly higher value of 235 (232) in. dwt. The footage included work done in the new No. 5 shaft area on the southern part of the property where of 3,630 ft. sampled, 37 per cent was payable averaging 269 in. dwt. compared with 49 per cent and 238 in. dwt. in the September quarter.

"Johnnies" Group.—The old Rand producers of the Johannesburg Consolidated group made a commendable showing last quarter.

There was again an improvement in East Champ d'Or's development footage sampled—2,990 ft. against 865 ft. previously. The pay ratio was 52 per cent and value 201 in. dwt. (against 202).

On Government Areas, the footage sampled was also higher—7,660 against 6,015; payability was down from 63 to 53 per cent and value of 202 in. dwt. went against 216 in. dwt.

As has been the case for several quarters, New State Areas again worked at a loss but, as previously this mine was able to show a credit balance with the aid of a premium, which for the December quarter amounted to £4,576. This was more than in the previous quarter, although all the other members of the group derived less from this source. Payability and value of the 1,370 ft. sampled were both better—29 per cent and 316 in. dwt. The mine's ore reserves of 81,000 tons compare with the monthly milling rate of 45,000 tons.

A satisfactory showing was made by Randfontein. For the fourth successive quarter, payability increased 45 per cent against 43) and value of 308 in. dwt. went against 295 in. dwt. Footage sampled was rather lower at 8,440 (9,070 ft.). Profit again showed a consistent trend (£72,711 against £71,802 in September quarter and £71,932 in June three months). Profit per ton milled came out at 1s. 6d. against 1s. 4d. for each of the previous quarters.

Witwatersrand Gold, which is repaying capital, managed to make a working profit of 2d. per ton or a total of £1,205; premium gold added £4,749. The slightly higher footage sampled of 1,010 ft. disclosed payability of 17 per cent with a value of 191 in. dwt.

General Mining.—West Rand Consolidated is the first South African gold mine to announce profits from a quarter's uranium operations. The plant started up last September and between then and the end of the year showed a net profit of £124,707, a substantially higher figure than had been generally anticipated. This brought the total for the December quarter up to £525,934 against £395,768 in the September quarter. Ore supplied to the west reduction plant and to the uranium plant was drawn solely from the Bird reef. Footage was rather more than previously and of the 9,795 ft. sampled the percentage payability was 55.64, value 302 in. dwt.

Anglo Transvaal.—Rand Leases reported that development sampled on all reefs amounted to 9,580 ft., of which 56 per cent was payable averaging 10.64 dwt. over 22.5 in. or 239 in. dwt.

Strathmore.—Development at Stilfontein expanded to 13,481 ft. and of the 4,625 ft. sampled, 80 per cent was payable, averaging 53.5 dwt. over 5.2 in. equal to 278 in. dwt. Payability previous quarter was 91 per cent. Working profit plus premium amounted to £145,818 against £5,518 previous quarter when milling started on July 1.

Others.—A consistent footage of development was carried out at New Kleinfontein and of the 7,915 ft. sampled (against 6,605 ft.), 3,840 ft. was payable averaging 5.3 dwt. over 39.6 in. (210 in. dwt.)

Of the 3,090 ft. sampled on Wit. Nigel, 38.5 per cent was payable averaging 11.3 dwt. over 20 in. (226 in. dwt.).

Footage sampled on Spaarwater was 3,490, of which 37.1 per cent proved payable averaging 8.6 dwt. over 38.6 in. No payable footage was exposed in the 37 west haulage.

COMPANY NEWS AND VIEWS

Gold Coast Main Reef's Steady Improvement

The report and accounts of Gold Coast Main Reef for the year to June 30 last carry a stage further the record of steadily improving performance which the company has been able to report in recent years. As will be seen in the tables below, both grade and volume of mill throughput showed marked improvement in the year 1951-52, resulting in an increase in gold production of about 20 per cent. Costs per ton, including development charges, showed a considerably smaller increase than in the preceding year, due partly to the 9 per cent increase in mill throughput and partly to a 20 per cent increase in labour productivity, compared with the previous year's figures.

Year to June 30	Milled (tons)	Grade (dwt.)	Yield (oz.)	*Cost per ton		Available Ore Reserves (tons) (dwt.)
				s. a.		
1950	97,944	6.7	28,983	60	3	297,190 8,60
1951	93,609	7.5	30,980	68	8	318,195 8.63
1952	101,775	8.2	36,965	70	10	335,659 8.31

* Including development charges

It is clear from the consulting engineer's report that the establishment, some three years ago, of efficiency and study departments at the mine is bearing good fruit, and that this year's remarkable increase in O.M.S. is due, in considerable measure, to the tightening up which has taken place in the control of labour and stores, as well as to the incentive bonus schemes which have been introduced on the fact-found basis of work studies of the operations concerned. The consulting engineer's report also ascribes considerable importance to the increased use of tungsten carbide drill bits.

Year to June 30	Bullion	Gross	Mine	Net	Taxa-	Divi-	Carry
	Revenue	Revenue	Costs	Profit	dend	tion	Forward
	£	£	£	£	£	%	£
1950	337,370	339,274	262,416	9,937	Nil	5	10,045
1951	384,034	390,099	284,627	34,413	Nil	5	15,206
1952	472,700	473,766	327,033	73,681	19,621	7½	38,435

The 20 per cent increase in gold production is reflected in the increased bullion revenue for the year, although this figure has been further improved by virtue of the fact that from October 1, 1951 to May 1, 1952, 40 per cent of the company's gold output was being sold at premium gold prices, while for the last two months of the financial year the entire output was being sold at premium prices. Premium gold prices have, of course, been fluctuating but on average the company has probably been earning better than 15s. an oz. extra on all its premium sales. The effect of this improved revenue position and relatively small cost increase has been to produce a net profit of £73,681 (more than double the figure for the preceding year), as a result of which the company has paid interim dividends for the year amounting to 7½ per cent, compared with 5 per cent in the two previous years.

Quarterly results since the end of the financial year, which are referred to on the opposite page, suggest that the rate of working profit continues to be well maintained. Moreover, mill throughput and gold recovery have both shown a small increase during the last six months of 1952, compared with the corresponding period in the preceding financial year; the tonnage treated being 51,000 (50,700) for a yield of 19,319 oz. (18,633).

Development work during the year continued to be satisfactory and resulted in a further increase of available ore reserves, which at June 30 last stood at 335,659 tons, averaging 8.31 dwt., equivalent to nearly 3½ years milling at present rates. Total development footage during the last financial year amounted to 6,014 ft. Since then, during the last six months of 1952 development has been at a somewhat lower rate, totalling only 2,457 ft., although payability of footage sampled has been maintained at nearly 90 per cent, with values in the neighbourhood of 450-500 in.-dwt.

United Tin Areas Production Increasing

One or two points of interest emerge from the chairman's review accompanying the report and accounts for United Tin Areas to June 30 last, the financial results for which were reported in this column in our issue of January 23. The company's investment interests now consist of 300,000 shares in the Esperenza Copper and Sulphur Company shown in the balance sheet at £9,808,

although the market value at June 30 last was nearly six times this amount. A note on Esperenza appears below.

The company also has an interest in Mines Development Syndicate, West Africa Ltd. which is shown at cost £11,553. It is this syndicate which has been concerned with the American Smelting and Refining Company and the Nigerian Government in the exploration of the Abakaliki lead-zinc deposits in Southern Nigeria. Now that A. S. & R. have withdrawn from this venture it remains to be seen whether and on what basis it can be continued.

Output of both tin and columbite showed an increase over the previous year, the figures being 102 tons tin concentrate and 9.3 tons of columbite concentrate, compared with 96 tons and 4.1 tons respectively. Since the end of the financial year, rate of production has further improved and during the six months to December last, production of tin concentrates totalled 73 tons, compared with 59 tons in the corresponding period a year ago, while production of columbite ore amounts to 7.05 tons (4.5).

With the high columbite premium which the United States is offering at present, the company is naturally concentrating its main attention on increasing the output of this mineral and plans are in hand for the installation of gravel pump equipment on the company's main leases, which is expected to be of particular assistance in stepping-up columbite production.

Esperenza's Interests in Cyprus

Since the Esperenza Copper and Sulphur Company disposed of its interest in the Seville Sulphur and Copper Company a year or so ago, Esperenza's sole interest has been in the Cyprus Sulphur and Copper Company of which it holds almost the entire share capital. The company's report and accounts for the year to March 31 last, which are only now available, in the main pre-date the commencement of ore shipments by the Cyprus company.

Up to the end of last month Cyprus Sulphur and Copper had shipped a total of 31,412 tons of high-grade copper ore, of which only 4,843 tons are represented in the accounts for the year under review. Nevertheless, this tonnage made possible a net profit for the year of £17,630. Working costs in the production of this tonnage have been exceptionally high, due in part to selective mining operations necessitated by the stringent specifications imposed by the buyers, and working profit has consequently not been more than about £6 per ton. It is anticipated, however, that as the scale of operations increases costs will be substantially reduced. Meanwhile, it is of interest to note that during the first eight months of 1952 the company had a net working profit of about £100,000.

The Cyprus Sulphur and Copper Company is developing two deposits, the Kinousa ore body and some old workings at Limni. Of the two, the Kinousa deposits are those to which the company is currently devoting its attention and at the beginning of September last ore reserves at Kinousa were estimated at 291,000 tons averaging 2.5 per cent copper, 3.8 per cent zinc and 44 per cent sulphur. Of this total 153,000 tons represented proved reserves with a higher average copper content of 3.5 per cent and a higher zinc content of 5.1 per cent.

New Guinea Goldfields' Good Results

The report and accounts of New Guinea Goldfields for the year to September 30 last reveal the benefits accruing from the company having the amalgamation section of the Golden Ridges Mill in continuous operation throughout the year.

*In respect of the years 1944-51. The company are disputing their liability and appeals are pending.

This enabled lode ore to be treated rather than as in the previous year when revenue was derived from alluvial operations.

Year to Sept. 30	Bullion	Gross	Expenses	Tax	Net	Carry
	Sales	Revenue			Profit	Forward
	£	£	£	£	£	£
1951	85,572	115,421	71,452	Nil	43,969	261,774
1952	208,463	328,373	284,831	13,157*	30,385	291,222

The capital expenditure on the mill's construction has meant a heavy and continuous drain on the company's liquid resources and explains why the dividend has again been passed. The annual meeting will be held in Sydney, Australia, to-day. Mr. J. Kruttschnitt is chairman.

Company Shorts

G.C. Selection Trust's December Quartiles.—The table below gives the quarterly profits during 1952 for the producing mines in the Gold Coast Selection Trust Group. These profit figures include revenue from premium gold sales, but do not include development charges and for this reason the profit figures do not correspond with those given in our issue of January 16 which showed the cumulative monthly results based on the monthly mine returns which do include development charges in the profit figure.

Company	Mar. Qtr. (1952)	June Qtr. (1952)	Sept. Qtr. (1952)	Dec. Qtr. (1952)
	£	£	£	£
Amalgamated Banket	87,150	67,617	94,786	92,475
Ariston Gold Mines	155,265	144,166	166,011	170,443
Bremang Gold	24,428	75,743	59,059	11,202*
Gold Coast Main Reef	40,430	37,137	39,334	44,735
Marlu Gold	22,732	19,853	35,938	35,658

* Total excludes £1,963 recovered from a clean-up.

Apart from Bremang the result for the December quarter were well sustained with Ariston establishing a record for any quarter of £170,443. Bremang's results during the year have been somewhat erratic, the operating profit for the whole year having totalled about £170,000, compared with £216,487 in 1951. The poor results in the December quarter are partly accounted for by the fact that the No. 2 dredge has been out of commission since last July when operation on the Ankobra River was discontinued with a view to the dredge being dismantled and transferred to the Offin River where excellent progress is reported in its re-erection. The No. 3 dredge was closed down from November 30 to December 26 for general overhaul, while the No. 4 dredge had to work through a stretch of unpayable ground resulting in a falling off in the yield per cubic yard. Better results are however expected from this dredge in the next quarter.

Development at Amalgamated Banket has continued on all three sections of the mine at about the same pace as in earlier months, and good progress is reported with the construction of the Fanti ropeway to the Central mill, the completion of which is expected by May next.

G.C. Main Reef reports a total of 833 ft. advanced during the quarter. 425 ft. were sampled of which 375 ft. proved payable averaging 10.34 dwt. over 42.5 in.

News of Ellaton.—A recent report from the Ellaton Gold Mining Company provides further evidence that in this mine the Strathmore group has another promising proposition, which like Stilfontein can be brought to the producing stage relatively quickly. Last May development at the 330 ft. level intersected the Vaal-Basal reef series yielding values of 1,262 dwt. Now news comes that at the end of last month the Vaal Reef was intersected in the main shaft itself at 770 ft. Although the reef was not exposed in the south-east end of the shaft due to a minor fault, sampling over the rest of the shaft area averaged 21 dwt. over 32.7 in., equivalent to 686 in. dwt. It is also reported that the No. 7 haulage connecting the main and ventilating shafts has now been holed through.

Writing of the Ellaton discovery in our last Annual Review our South African correspondent forecast that the Ellaton mine should not be far behind Stilfontein in coming into production and although we have no recent information of the progress that is being made in installing the reduction plant, which was being transferred to the mine from West Africa, it looks as if the sinking of the main shaft must be nearing completion.

It is probably not without significance for the prospects of this mine that the bulk of the Ellaton shares are believed still to be held by the participating companies—namely Strathmore, Eastern Rand Extensions and Anglo-Transvaal.

Uruwira Minerals Sterling Loan.—Uruwira Minerals Ltd. announced that it has signed a further contract with the United States Government acting through the Defence Materials Procurement Agency for a sterling loan of £200,000.

This is to be utilized in the purchase, in the sterling area, of certain items of machinery and equipment for its Development Programme which were intended to be purchased in the United States from the dollar loan for which a contract was signed with the United States Government early in 1952. The substantial rise in dollar prices, the announcement stated, has rendered the first loan inadequate to purchase all the items for which it was provided. Further particulars will be given in a Circular which will be issued shortly to Shareholders and holders of the Company's Unsecured Loan Stock.

The African Investment Trust: No Change.—The profit and loss account of The African Investment Trust for the year to June 30 last showed that after providing for all charges including taxation liabilities of £12,309 (£9,818), the net profit of £16,338 was virtually unchanged from the preceding year when it amounted to £16,217. The allocation to general reserve was increased from £9,818 to £12,309. The dividend distribution on the 10s. shares forming the £300,000 issued capital was maintained at 5 per cent. which required £7,875 and the carry forward at the financial year end was £12,388 compared with £13,925. Sir Joseph Ball is chairman.

Indian Gold Mines Power Cuts.—Advices received from the managers of Mysore, Champion Reef, Ooregum and Nundydroog mining companies state that due to shortage of water for power generation, owing to the failure of seasonal rains, the government of Mysore have imposed power cuts from January 15. The cuts are expected to continue until the end of May. Loss of production is estimated at up to 30 per cent. according to the cuts, which may vary.

British Tin Investment Pays Less.—According to a preliminary statement issued by British Tin Investment Corporation, the provisional net profit of the company and its subsidiary for the calendar year 1952 was £214,650 compared with £304,778. This net figure was struck after meeting all the usual charges including tax liabilities totalling £398,300 (£280,750) of which £106,000 was required for E.P.L.

Shareholders also took a reduction in their dividend income, the recommendation of a final dividend of 13 per cent. brought the total distribution for the year to 18½ (27 per cent.) which required a net amount of £204,456 against £298,396.

Mr. E. V. Pearce is chairman. The issued capital is £2,105,085 in 10s. shares.

Seremban.—The net profit of Seremban for the year to June 30 last, after providing for all expenses including taxation, amounted to £85 (£368). At the financial year-end the adverse balance carried forward was £1,489 compared with £1,574 brought in.

Mr. D. W. Thomas is chairman. The annual meeting is being held in Redruth, Cornwall, to-day.

Obituary

WILLIAM ANTHONY MICHELL

William Anthony Michell died at Redruth on January 25, aged 75.

He was the youngest son of the late F. W. Michell and after training at the Redruth School of Mines, was a demonstrator there for a short time before going to North-West Australia where he became manager of the New Bala Copper Mine.

On returning to Cornwall, he became a partner in the firm of Michell Bros. and with his brother, the late Frank H. Michell, carried on the work of consulting engineers established by his great-grandfather, who was a contemporary of James Watt. In this connection he was associated with a number of local mines including Wheal Busy, Wheal Florence, Parka Mines Parkancy, Wheal Kitty and Polhigey.

For nearly 30 years he lectured in chemistry, assaying and mineralogy at the Redruth Evening School, retiring in 1947.

During the latter years of his life, Mr. Michell devoted a very great deal of his time to the study of the history of the Cornish Pumping Engine and was one of the foundation members of the Cornish Engine Preservation Society, being joint secretary for many years.

He was a member of the Newcomen Society, the Cornish Institute of Engineers (of which he was a member of council) and for many years an Associate of the Institution of Mining and Metallurgy.

JOHN DAVID RHEINALLT JONES

Dr. John David Rheinallt Jones died in South Africa on January 30. He was Hon. Master of Arts, Witwatersrand University, and at the time of his death was adviser on Native Affairs to the Anglo American Corporation of South Africa and was President of the Institute of Race Relations.

Dr. Rheinallt Jones was director of the Institute of Race Relations from its inception in 1929 until 1947. In the latter year he was elected President. From 1937 to 1942 he was Senator elected by the Natives' Electoral College of the Transvaal and Orange Free State, and in addition was honorary lecturer on race relations at Witwatersrand University and was assistant secretary of the University from 1926-1929.

Dr. Rheinallt Jones was born in 1884 and was educated at Friars School, Bangor, and David Hughes Grammar School, Beaumaris. He was the youngest son of the late Rev. J. Eideon Jones of Bangor, North Wales. He went to South Africa in 1905.

MALAYAN TIN DREDGING

SOUTHERN MALAYAN TIN DREDGING

The adjourned annual general meetings of the Malayan Tin Dredging Ltd., and Southern Malayan Tin Dredging Ltd., were held on January 29, in London.

The following are extracts from the statements of the chairman, Mr. Ernest V. Pearce, circulated to shareholders.

In Malaya there appears now to be a greater measure of co-operation between the public and the authorities; as a result much more information than hitherto is becoming available regarding the terrorists' movements.

We all realize that the war in Malaya is by no means over; meanwhile our staffs and their families, in common with others, continue to carry out their duties with a courage and loyalty which merits our admiration and gratitude.

PROSPECTING IN MALAYA

For rather more than 20 years prospecting has been almost at a standstill, and as a result very few payable areas have been located to take the place of those which are nearing exhaustion. Until active prospecting can be resumed it is difficult to see how production can be maintained even at its present level.

It is, I think, the general opinion that the likelihood of proving anything but low-grade and perhaps deep areas is fairly remote.

In this connection it is encouraging to note what Sir Gerald Templer is reported to have said at his conference already referred to: "I think the time has now come when, in certain areas, we can go in for a considerably increased amount of geological survey. We cannot do it generally, but in special areas, by taking additional security measures, I hope we can make a start in a short time." He is further reported to have said: "The basic reason for falling tin production in Malaya was not the emergency but the using up of the known reserves of ore."

TAXATION : E.P. LEVY INQUITIOUS

For the first time we are faced with that iniquitous tax—"Excess Profits Levy." The imposition of this tax is astonishing when the declared policy of the U.K. Government is that of pushing on with the development of the Colonial Empire, and when it is generally acknowledged that one of the most urgent problems facing the Malayan Government is the future development of its tin industry to correct the falling tendency of production there.

Malaya is now confronted with the certainty of a serious though probably gradual fall in tin production, and it seems obvious that dredging companies now operating in Malaya are in the best position and are best fitted rapidly to make their contribution to the future development of the industry. It therefore remains with the United Kingdom and Malayan Governments to take such action as will make it possible for the industry to do so—by restoring law and order in Malaya as quickly as possible, and by putting mine taxation on a basis which will enable companies again to build up reserves by ploughing back profits adequate to meet the altered conditions of to-day.

This calls for the complete removal of the excess profits levy, which should never have been imposed on companies operating wasting assets such as tin mines in Malaya, where high risk capital is employed. But it also calls for revision of the capital allowances on plant, which at present have little relationship to the increased cost of replacement.

As far as the future of tin is concerned I see no reason to expect a very material fall in the price. There will, of course, be fluctuations, but in view of the constant increases in costs a price in the region of that obtaining to-day is absolutely in the accounts of Southern Malayan Tin Dredging Ltd. are essential if the world's tin requirements are to be satisfied.

As an illustration of the effect of present taxation the figures instructive, for they show that out of a profit of £1,200,548 no less a sum than £771,228 is absorbed by profits levy, income-tax and excess profits levy, the last of which operated in respect of six months only. In addition, it should be noted that the company paid to the Federation Government in export duty alone the sum of £292,477.

The Tin Research Institute continues its efforts towards improving and developing new uses for tin with great advantage to both producers and consumers. It is satisfactory to know that the Institute is receiving increased support from tin producers, for undoubtedly the application of adequate research cannot fail to produce beneficial results.

The reports and accounts were adopted.

SUNGEI BESI MINES

AYER HITAM TIN DREDGING

The adjourned annual general meetings of Sungei Besi Mines Ltd., and Ayer Hitam Tin Dredging Ltd., were held on January 29, in London.

The following are extracts from the statements of the chairman, Mr. G. W. Simms, circulated to shareholders.

Having regard to the future development of the Malayan tin industry there are few things which could be more disastrous than the excess profits levy introduced by the present Government. But there are two other important matters that need urgent revision. They are the allowances for depletion of property, at present woefully inadequate as an incentive, and the capital allowances on plant, which take no account of the greatly increased cost of replacement.

It seems almost incredible that the excess profits levy should be applied to mining companies operating in Malaya at a time when the further development of the tin-mining industry there is a vital factor as regards the future welfare of that country: when the declared policy of the United Kingdom Government is the development of the resources of the colonies and protectorates, and when mining companies operating in Malaya have suffered such heavy capital loss through tin ore extracted by the Japanese for which they have not, and will not, receive any compensation.

The Federation Government, when income-tax was introduced, stated that the export duty on tin would be reduced. The time has come when the Government should take action to implement its promise. There is clear evidence that marginal cost producers are falling out, and that the working of higher-grade ground has become a necessity.

There is a tendency to impose further burdens which are in effect a form of taxation, as is exemplified in the recently published Education Ordinance under which mining employers are called upon to provide educational facilities. Education is a responsibility of the State.

Probably the best chance of future major development within the Malayan tin industry lies in proving and equipping big low grade dredging propositions and lode tin properties. Both of these call for heavy capital outlay. It is in the best interests both of this country and Malaya that the high risk capital for such mining enterprise should be found, as in the past, in the United Kingdom, and that the scale of mine taxation here should make that possible. It has been stated by responsible Government Ministers that it is necessary in future to secure the introduction of capital into the Colonial Empire from sources other than the United Kingdom.

Nevertheless, it almost invariably follows that the control of an enterprise is placed in the hands of the nationals of the country from which the capital is derived, and it naturally follows that orders for plant and equipment for such enterprise are also placed in the country from which capital is derived.

It is still not possible freely to prospect throughout Malaya. It is therefore not surprising that tin production in Malaya shows a tendency to fall.

It is obvious that the chances of increase in production are now much reduced by reason of the fact that so much of the tin-bearing area of Malaya has already been developed and is in process of being worked out.

BEST HOPE FOR THE FUTURE

In my opinion the best hope of future development within the industry lies in locating and proving big low-grade deposits suitable for dredging, and lode tin or primary deposits. Both of these call for heavy capital outlay, and although I believe that Malayan production will fall over the next few years, and that it is unlikely again to reach a level approaching the immediate pre-war rate, nevertheless I also believe that, if the U.K. and Federation Governments are prepared to make their contribution, Malayan producers can be relied upon fully to develop the industry so that a production rate of, possibly, between 50,000 and 60,000 tons per annum may be maintained for some years to come.

The Report of the United States Tin Mission to Malaya has been published, and it is satisfactory to know that it should have the effect of removing the unfortunate misconceptions in regard to Malayan tin production and Malayan producers which appeared to exist in the minds of the American Government and consumers. Now that the facts have been clearly stated by its own Mission it is hoped that the American Government will take early action to remove all restrictions on the consumption of tin.

The reports and accounts were adopted.

ANGLO AMERICAN CORPORATION GROUP OF COMPANIES

DECLARATION OF DIVIDENDS

NOTICE IS HEREBY GIVEN that dividends in respect of the year ended 31st December 1952 have been declared payable to shareholders registered in the books of the undermentioned companies at the close of business on the 13th February 1953.

The dividends are declared in the currency of the Union of South Africa and become due on the 14th February 1953. Dividend Warrants will be posted from the Head and London Offices on or about the 19th March 1953.

The dividends are payable subject to the usual conditions which can be inspected at the Head and London Offices of the companies.

Each Company's Transfer Books and Register of Members will be closed from the 14th February 1953 to 21st February 1953, both days inclusive.

Name of Company (Each of which is incorporated in the Union of South Africa)	Divi- dend No.	Rate of Divi- dend per share in Union of South Africa Currency	Effective Rate Non- Resident Shareholders' Tax	Estimated Profit for year ended 31.12.52 after providing for Taxation
(a) Anglo American Investment Trust Limited.....	26	7s.	6.0%	£3,670,000 (Previous year £2,246,000)
(b) The New Era Consolidated Limited	65	9d.	6.075%	£614,000 (Previous year £131,000)
(c) West Rand Investment Trust Limited	10	9d.	7.5%	£588,000 (Previous year £614,000)

NOTES

- (a) Final Dividend making with the Interim Dividend of 5s. declared on the 19th June 1952 a total of 12s. (same) for the year. The profit for the year includes a scrip dividend from the Diamond Corporation Limited of shares in De Beers Investment Trust Limited valued at £500,000. Out of the estimated profit of £3,670,000 an amount of £2,000,000 (£750,000) has been transferred to General Reserve.
- (b) Final Dividend making with Interim Dividend of 6d. declared on the 19th June 1952 a total of 1s. 3d. (1s. 1½d.) for the year. Revenue for the year includes an exceptional item representing accumulated profits of a former subsidiary company. Other revenue totalled £105,000. Out of the estimated profit of £614,000, an amount of £500,000 (£100,000) has been transferred to General Reserve.
- (c) Final Dividend making with the Interim Dividend of 7½d. declared on the 19th June 1952 a total of 1s. 4½d. (same) for the year.

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Mining Matters

The Institution of Mechanical Engineers has announced the following activities. Tonight, February 6, the Automobile Division holds a dinner and dance at the Dorchester Hotel, Park Lane, W.1., at 7 p.m. for 7.30 p.m. On Tuesday, February 10, at 5.30 p.m., a discussion on "Ignition Interference with Television Reception," by A. H. Ball, A.M.I.E.E., and W. Nethercot, M.A., B.Sc., is being held by the Automobile Division at a joint meeting with the Institution of Electrical Engineers. A conference on Hydraulic Servo-mechanisms is being held on Friday, February 13, at 10.30 a.m., 2.30 p.m. and 5.30 p.m. This conference comprises a series of six papers.

Two other discussions are to take place during February; an "Investigation of Fretting Corrosion," by K. H. R. Wright, Ph.D., at 5.30 p.m. on 20th, and a discussion on "Developments in Steel Castings" in the heavy power plant industry by F. Buckley, B.Sc. on 27th.

New Metals and Chemicals Ltd. appoint Japanese representatives. New Metals and Chemicals, 16 Northumberland Avenue, W.C.2, announce that they have appointed New Metals and Chemicals Corporation of Miura Building, 5 Ginza Higashi, 4 Chome, Chuo-ku, Tokyo, as their representatives for Japan. The Japanese business is under the management of Mr. J. Barth who took up residence in Japan in 1921.

The Fourth Gauge and Tool Exhibition to be organized by the Gauge and Toolmakers' Association of London will be held in the New Hall, Elverton Street, Westminster, London, S.W.1., from Monday, May 17, to Friday, May 28 1954, both days inclusive.



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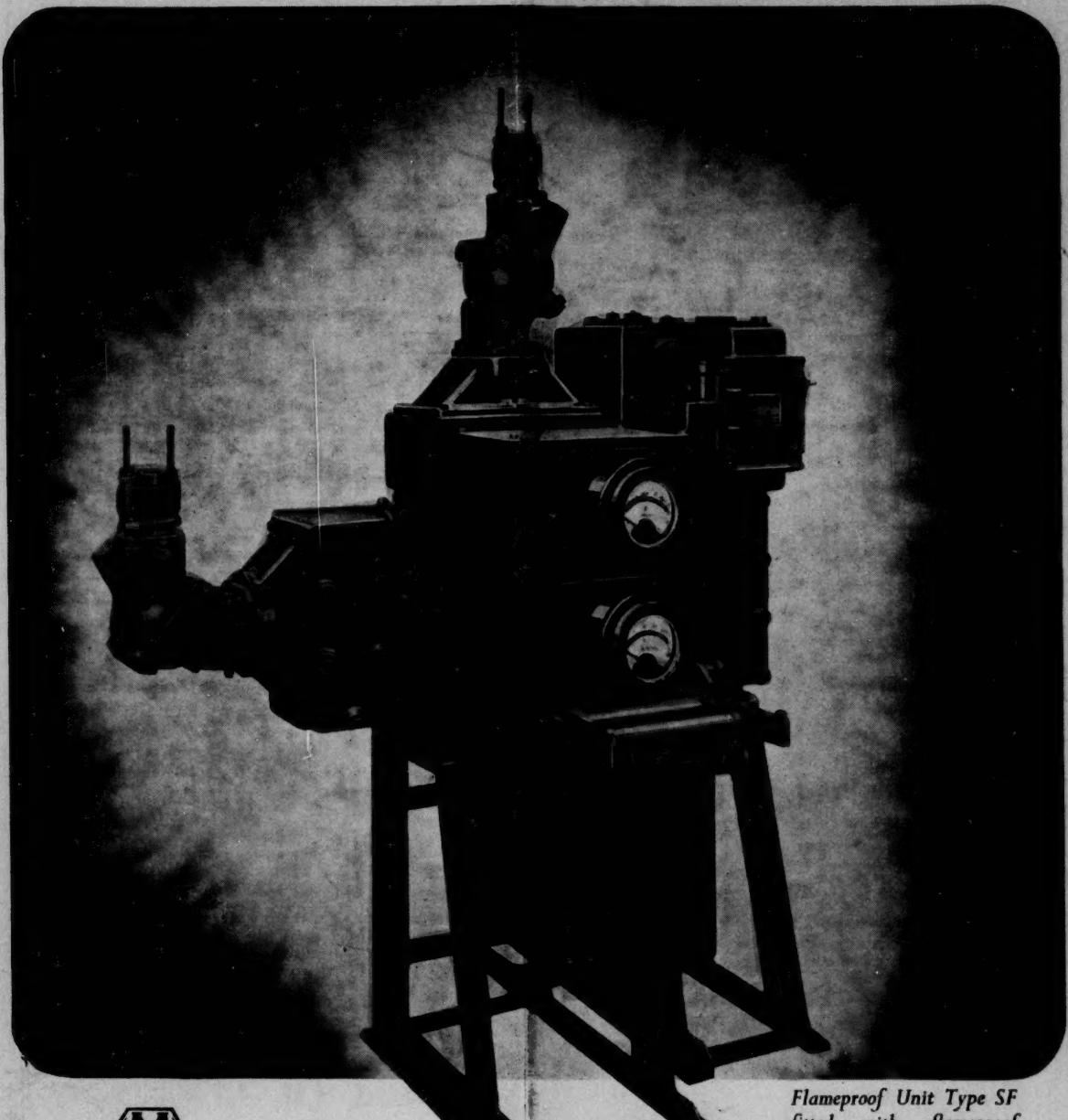
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